FOREIGN LANGUAGE ACQUISITION: PROCESSES AND CONSTRAINTS

Loan Hong Thi Dao

A thesis submitted

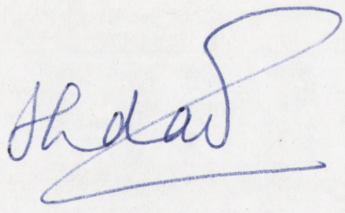
for the degree of Doctor of Philosophy

of The Australian National University

August 2007

Statement

Except where it is otherwise acknowledged in the text, this thesis represents the original research of the author.



Loan Hong Thi Dao

Canberra, August 2007

To my late Parents - the Past,

... and to my Children - the Future ...

ACKNOWLEDGEMENTS

This research would not have been developed from its very early idea without the financial and technical support in the form of a scholarship and computers from the Graduate School and the Faculty of Arts at the Australian National University. I am indebted to the Dean of the Arts Faculty, Professor Adam Shoemaker, and to the Head of the School of Language Studies, Dr Harold Koch, for their support and understanding.

Helping me arrive at this point of my PhD is the patience, kindness and professionalism of Dr Louise Jansen, my principle supervisor. My deepest gratitude goes to Dr Jansen for her guidance and support throughout those years, especially in the later stages of my PhD when obstacles seemed mountainous.

I am also grateful to Dr Johanna Rendle-Short and Dr Avery Andrews, members of my supervisory panel, for helping me gain extra understanding and confidence in my research by spending their precious time in explaining, answering my questions, reading my final draft and giving me valuable feedback.

My special thanks to Dr Jeff Wood and Ms Christine Donnelly, of the Statistical Consulting Unit, Graduate School, for their professional help in analysing my online data, and for their time spent in researching and answering my questions in relation to data analysis tools.

I am thankful to Mr James Grieves and Dr Louise Skelt, of the School of Language Studies, ANU; Mr Malcolm Paull, of Dickson, Canberra; and Dr Bronwyn Dyson, of the University of Macquarie, for their careful and detailed checking and correcting the test materials for my online experiments; and to the members of our

Processability Theory experts group, locally and internationally, in particular Dr Ira Armstrong, who have shown interest in and support for my work through listening (year after year) to my presentations and giving me their experienced comments.

My sincere thanks must go to Mr Paul Johns and Mr Tony Ruggeri, for their prompt responses to all computing matters and requests; and to Dr Kevin Windle, Dr Elizabeth Minchin, Ms Francesca Foppoli and other administrative staff at the School of Language Studies for helping me deal with administrative matters.

My gratitude must also go to the following people who either directly or indirectly involved in my studies: Mr Dien Nguyen; the Director and 12 ESL students at the Secondary Introductory English Centre in Dickson, Canberra; Mr and Mrs Paul and Belinda Cavinchi; the Principal and 12 students at the Orana School in Weston, Canberra; and many people and organisations in Vietnam, in particular, members of the Vu family, my cousin – Duan, the principles, teachers and students of the 6 secondary and high schools in Ho Chi Minh City; without their help, acceptance, appreciation and enthusiasm for knowledge and research, this thesis would not have been realised.

Last but not least, my heartfelt Thanks to all members of the Dao family, especially my late Mother - whom I miss to share this moment, my Sister - Nam, my Brothers – Dan and Duc, my Nephews – Thang and Tue, for their enduring love, support and belief in me; ... and to my Children, Olek and Agnieszka, whose beautiful eyes keep lighting all my way ...

ABSTRACT

This thesis investigates if Processability Theory's Procedural Skills Hypothesis (Pienemann, 1998) applies to Vietnamese learners of EFL in their process of acquiring the English formative –s. The hypothesis predicts that the processing procedures needed to acquire the various functions (nominal and verbal markers) of the English formative –s develop stepwise, and that these processing procedures once automated are similar in native speakers and in skilled learners.

Two different but related cross-sectional studies were carried out. The first study was based on speech production data of 36 adolescent, formal Vietnamese learners of EFL. The data was elicited via a series of communicative tasks, was later transcribed, analysed, and types and tokens were recorded. These formed the basis for three further stages of analysis: (1) a quantitative distributional analysis, (2) a qualitative analysis using an emergence criterion for acquisition, and (3) an implicational scaling analysis. The second study was based on the reaction times, of the same learners and a control group of 12 native speakers of the same age group, in a series of sentence matching tasks. The reaction times data was statistically analysed using Generalized Linear Models (GLMs) and Generalized Linear Mixed Models (GLMMs), described by Dobson (1990) and by McCulloch and Searle (2001) respectively.

Results of the production study lend strong support towards the developmental nature of the verbal marker –s, but not towards that of the nominal markers –s, as predicted by Processability Theory. Results of the on-line study show that, both native speakers and Vietnamese skilled and non-skilled learners exhibit similar ***ungrammaticality*** effects, not ***grammaticality*** ones as predicted by the same theory.

In the light of the studies' findings, an agenda for future research and implications for teaching are suggested.

CONTENTS

CHAPTER 3
STUDIES ON ACQUISITION OF MORPHOLOGIES OF ENGLISH AS A SECOND LANGUAGE

APPENDICES

LIST OF FIGURES

LIST OF TABLES

CHAPTER 2

CHAPTER 3

CHAPTER 4

CHAPTER 5

CHAPTER 1
INTRODUCTION

1.1 Research Background

English is no doubt the most taught foreign language in Vietnam, not only during the Vietnam War when involvement from English-speaking countries such as America, Britain and Australia was deep, but especially so after the unification of the country was established in 1975. The need to develop its economic conditions prompted the government of Vietnam to open its doors to the outside, industrialised world. This has lead to the 'booming' requirement of English, the language most used in trades and science.

Officially for decades, English, along with other foreign languages such as French, has been taught from entry to secondary school level in Vietnam. As demands for this language skill exponentially increased since the 1980s, so came the establishment, at times uncontrollable, of private English teaching schools and centres, owned and conducted either by local professionals or by overseas institutions. The lack of central planning in the English teaching and learning syllabus and methodology, and the resulted discrepancies in the students' knowledge and performance were just a few areas where the 'chaos' occurred.

Despite recent government efforts in establishing a unified, continuous teaching and learning syllabus within public schools nationally, inconsistencies in the students' knowledge gain and performance and frustration of English teachers remain high. The chaos and frustration of the teachers, the parents and students in Vietnam have developed into some 'churning' questions: How could the situation be improved? Could there be a feasible teaching approach that both government

and private schools and centres should be able to adopt? Could there be a feasible syllabus that works well for both teachers and students?

As second language acquisition (SLA) research "began with firm links to language teaching" (Ellis, 2004: ix), it is natural for this thesis to root in these questions.

1.2 Theoretical Background

To set about this research, it is vital for me to position myself and be guided by a language acquisition theory which serves as the foundation underlying my enquiries.

Since the 1950s, there have been various theories and approaches towards language acquisition, addressing either first and/or second language, such as Skinner's (1957) Behaviourism, Chomsky's (1965) Universal Grammar theory, Corder's (1967) Error Analysis approach, Selinker's (1972) Interlanguage theory, Schumann's (1978a, 1978b, 1978c) Acculturation or Pidginisation theory, Krashen's (1981, 1982, 1985) Monitor Model, and Neo-Vygotskyan Socio-cultural theory (Lantolf, 1994). The theoretical position that underlies my research is Processability Theory (PT) (Pienemann, 1998), in particular, the Procedural Skills Hypothesis. This hypothesis assumes that in the process of acquiring the grammar of a second language (L2), learners have to "create language-specific processing procedures" (Pienemann, 1998: 73). These procedures have to be acquired and automated through developmental stages where 'procedural skills' of one developmental stage provide the prerequisite for the next stage. Following Clahsen, Meisel and Pienemann (1983) and Pienemann (1998), developmental stages are understood as incremental levels of speech processing ability which result in all learners acquiring the L2 grammar in the same order. A detailed description of PT along with an overview of its predecessor theories will be presented in the next chapter,

chapter two; and PT's Procedural Skills Hypothesis with its empirical support will be defined in the context of the Online Study in chapter 5, section 5.2.2.4.

As the focus of this thesis is on EFL, I have chosen PT as the theoretical framework for my research because of its claimed ability to explain and describe learners' developmental stages during their process of learning an L2. It is PT's very prediction of which grammatical structures can be processed by a learner at a given time of development (Pienemann, 1998: 331) that attracts me and leads me into this research. By working within this framework, I hope to have been able to find some answers to the questions of a feasible English teaching syllabus and methodology.

1.3 Aims and Objectives of the Research

The aim of this research is to investigate if the Procedural Skills hypothesis, laid out by PT, applies to Vietnamese learners of EFL. In particular, this research will look at the procedural skills that are needed to acquire the English formative '-s' which can function morphologically as a plural marker (e.g. *I like dogs, I have two dogs*), a possessive marker (e.g. *I like Ben's dog*), or as a 3rd-person-singular verb marker (e.g. *Kim walks to school*). These morphological markers are the object of this research because of the well-documented difficulty in acquiring them by Vietnamese learners of English (Sato (1984, 1985), Benson (1988), Osburne (1996), Hansen (2004) and in particular, Johnston (1997)). PT predicts that these linguistic features should emerge successively in learners' production.

To determine if PT's prediction applies to Vietnamese learners of EFL, two studies were conducted with Vietnamese participants who were learning English at secondary and high schools in Ho Chi Minh City, Vietnam. The first study was based on the speech data produced by these participants through a series of tasks

which were specifically designed to elicit the tested structures. The second study, a supplement to the first, was based on the reaction times data from the same participants through a series of visual linguistic stimuli bearing the grammatical and ungrammatical tested structures. Both studies were aimed at providing typological and empirical data evidence for Vietnamese learners' EFL processing procedures under time constraints which were seen by Pienemann (1998: 215) as a "nature of language processing".

These two related studies intend to lay the foundation for the possible development of a suitable teaching syllabus, at least for Vietnamese learners of English as a Foreign/Second Language (EFL/ESL).

1.4 Operational Definitions of Some Key Terms

In this thesis, the term 'language acquisition' is used interchangeably with the term 'language learning', to refer to the process of learning or acquiring a language, whether in a formal, planned and systematic setting or in an informal and unstructured one.

Similarly, following SLA literature in general (e.g. Gass (1997: ix) where the term 'second language' is used interchangeably with the term 'foreign language' to refer to any languages other than one's native language, and PT, whose principles apply to all types of language acquisition – first, second, third, foreign, impaired, etc, the present thesis adopts the term 'foreign language' for its title and throughout the thesis as this is its empirical base.

And finally, the term 'SLA research' refers to a research field that tries to explain this second language learning process. Better understanding of this process will assist language teachers and learners.

1.5 Organisation of the Thesis

Following this introductory chapter is chapter two, a chapter on theories of language acquisition, either of a first or a second language. In this chapter, an overview of the most prominent theories and hypotheses on language learning since the 1950s to the present day is presented.

Chapter three is devoted to studies on EFL/ESL conducted prior to this research. Particular attention will be paid to those studies that deal with the English morphologies that this research focuses on.

Chapter four documents the speech production study of thirty-six Vietnamese learners of English in Ho Chi Minh City. In this chapter, learners' production is presented, analysed and interpreted within PT's framework.

Chapter five describes the on-line study, conducted on the same participants and on a control group of native speakers. Learners' and native speakers' reaction times are analysed, compared and interpreted. Within the learners' group, analysis is also carried out between sub-groups based on results of the production study.

Chapter six concludes the thesis with a summary of the two studies and their results. The chapter also presents some implications of the research which contribute to language learning and teaching practice and provides some suggestions for future research.

"... In a strict sense... theories are not 'accepted' or 'proven' – rather the successful theory is tested and escapes being disconfirmed."

McLaughlin (1987: vii)

CHAPTER 2

THEORIES ON SECOND LANGUAGE ACQUISITION: AN HISTORICAL OVERVIEW

2.1 Chapter Overview

This chapter provides the reader with a view of the development and evolution of theories and approaches to SLA over the last five decades. The chapter serves the purpose of demonstrating how SLA has laid the theoretical foundations for this thesis. It does not aim at providing an exhaustive description of early theories and approaches, but rather confirm the theoretical foundation of today's SLA thinking. Having equipped the reader with this knowledge, the secondary purpose of the chapter is for readers to be able to make a connection between SLA theory, SLA research and language teaching. These three areas of the field are said to be 'inseparable' in that, "theory informs and guides research ... is evaluated on the basis of research ..." and research's "application to teaching practice" (McLaughlin, 1987: 1-3).

There are two main ways of looking at past theories and approaches, one is based on schools of thought, and the other follows the temporal flow. This chapter will take on both ways, with the first, presented in section 2.2, serves as an introduction to the second which will be presented in detail in section 2.3. More emphasis is put on describing past theories and approaches by time, section 2.3, as this will give the reader a clearer picture of the evolution of theories and approaches to SLA.

2.2 Theories and Approaches by Tradition

This section follows Johnson (2004) in identifying three major scientific research traditions that greatly influenced theories and methods of SLA. These are (1) behaviourist, (2) cognitive-computational, and (3) dialogical (with particular emphasis on Vygotsky's socio-cultural theory). Each of the SLA theories and approaches since the 1950s until now is fundamentally associated with one of these three traditions.

2.2.1 Behaviourism dominated the field of SLA in the 1950s and early 1960s with its most recognised application, the Contrastive Analysis (CA) approach and the AudioLingual Method (ALM) in language teaching. Behaviourism focused on the learners' external environment which was believed to serve as a stimulus for all learning. Learning was then considered as merely a process of habit formation whereby learners were induced to make use of the stimulus. Behaviourists considered learners' mental processes as subjective, inaccessible; therefore only learners' behaviour was measured and interpreted.

2.2.2 The Cognitive-Computational tradition on the other hand, strongly emphasised the role of human mind and its mental processes. Cognitivists compensated for the behaviourists' idea of the inaccessibility of learners' mental processes by applying the hypothetico-deductive method. This method helps establish theories that consist of hypotheses with definitions and descriptions of the conditions under which an experimental test or observation was conducted (Harré and Gillett, 1994: 10), and from which possible statements or laws could be drawn. These statements or laws then could be deduced to form a prediction or an explanation of certain phenomena. The application of this method has resulted in various SLA theories and approaches from the late 1960s, starting with the well-known Universal Grammar of Noam Chomsky (1965), followed by the 'ambitious'

Monitor Model of Krashen (1977-1985), and Processability Theory of Pienemann (1998), to name just a few.

The latest of these theories and approaches, Pienemann's (1998) Processability Theory, is one of the newest versions of the cognitive tradition where the computational, information processing side of the human mind is stressed. This perspective on human cognitive development could not avoid criticism, from the third tradition, the dialogical, for disregarding the important aspect of social, communicative goal of language as a tool.

2.2.3 The Dialogical tradition, as the name implies, emphasises the 'dialogue' between and among language learners, and is embraced by scholars such as Vygotsky (1978, 1987) and his successors. This approach attempts to bring back the balance between human mind and body, between human external and internal environments, thus between the behaviourist and the cognitive tradition. It "takes into consideration the dynamic role of social contexts, individuality, intentionality, and the sociocultural, historical, and institutional backgrounds of the individual involved in cognitive growth", and unites them "by the mediating power of the most elaborated system of signs – language." (Johnson, 2004: 16)

The next section of this chapter will look, in more details, at the above outlined theories and approaches to SLA from the temporal point of view.

2.3 Theories and Approaches by Time

This section addresses three main phases. It starts with the 1950s and 1960s, then proceeds to the 1970s and 1980s phase, and finishes by looking at the latest phase, the 1990s and beyond.

2.3.1 The 1950s and 1960s

In this sub-section, a short description of *behaviourism*,, its belief in how second languages were learnt at the time, and how the 'Chomskyan revolution' in linguistics impacted on the field of first and second language acquisition are presented.

2.3.1.1 Contrastive Analysis (CA)

Strongly associated with the post-war period was the learning theory that was dominant in mainstream psychology of the time, that of ***behaviourism.*** In the behaviourists' view (e.g. Skinner, 1957), all learning occurred through a process of *habit formation.* In language learning, whether it was the first or the second language, these habits were seen to be formed through repetition and imitation of the language that the learner was learning.

In second language (L2) learning in particular, it was believed that to acquire a second language was to replace the habits formed through acquiring one's first language by those that were forming through one's learning the second language. Consequently, interference from the first language with the second language learning process was considered to be almost unavoidable. This thinking led to the language teaching approach of the time termed Audio-lingual Methodology (ALM) where materials and classroom interaction were structured around dialogues to be memorised and pattern practices or drills to be repeated; and second language teachers had to take great care in not letting learners make errors when they tried to produce the language, as errors were perceived as bad habits.

Such a belief in the learning process brought about an outcome that teaching should concentrate on the differences between learners' first and second languages. These differences were said to cause difficulty in learners' learning

process. Thus it was desirable that language teachers had a good working knowledge of these differences. This resulted in an influential research approach at the time named *Contrastive Analysis* where researchers took on the tremendous task of comparing pairs of languages in order to find out and document those areas of difference. As stressed by Fries (1945: 9), "the most effective materials are those that are based upon a scientific description of the language to be learned, carefully compared with a parallel description of the native language of the learner". This research approach continued influencing second language teaching and learning at the time, despite many criticisms, including Chomsky's (1959) fierce critique of Skinner's views in his 1957 book *Verbal Behaviour*.

2.3.1.2 Universal Grammar

In fact, with the publication in 1957 of his book *Syntactic Structures*, Chomsky had already initiated a shift from *structural linguistics*, which emphasised the description of the surface structure of human languages, to *generative linguistics* that stressed their rule-governed and creative nature. This linguistic shift was associated with the shift in the field of psychology which favoured more developmentalist views of learning than Skinner's view of environmental role (cf. Piaget and Inhelder, 1966).

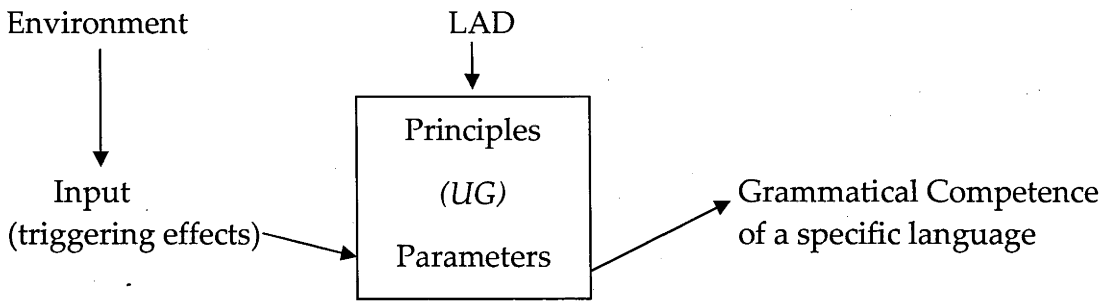
Chomsky's main criticisms of behaviourism constituted his linguistic theory, Universal Grammar (UG), of which the primary interest was in the universal aspects of human languages and whether or not humans had a special language faculty in the brain. UG therefore, is neither a theory of learning, nor is it a theory of language description, but it is rather about what is in the human brain. It is not a theory of learning to the extent that it focuses on describing the innate components and how these relate to specific languages, rather than focusing on how these are acquired. Nonetheless, UG has greatly influenced many areas of linguistic

research, including SLA research. To be able to understand UG's influence on SLA, it is necessary to study the concept of UG itself, and then to examine its application in SLA research.

At the end of the 70s, the idea of *Universal Grammar* developed into the *Principles* and *Parameters Approach,* the latter need to be set on the basis of the impact for language specific features. This set of principles and parameters is stored in our mind, helps us acquire our languages, and helps define what all human languages have in common and what makes them different from each other. This set of principles and parameters is, argued by Chomsky (1980, 1981a, 1981b), included in an innate faculty which he called the *language acquisition device* (LAD). This device and its components form an indispensable ability of a child to acquire his or her first language. Thus, UG is, partially, a theory of first language acquisition.

Chomsky's model of first language acquisition defines the LAD and its UG as a "'mental organ', analogous to the heart or the vision system or the system of motor coordination and planning" (Chomsky, 1980: 39). Being a mental organ, the LAD is biologically predetermined and therefore evolves according to its genetic code. Its growth is said to be triggered by the input that the child is provided with by his or her environment. Once triggered, the child's grammatical knowledge opens up and develops according to his or her genetically determined route. This process of first language acquisition is depicted in figure 2.1 below.

Figure 2.1 Chomsky's model of first language acquisition (after Chomsky 1981b)



This theory of first language acquisition from Chomsky has appealed to researchers working in the field of SLA in at least two areas. Firstly, if UG claims that it is a theory of human or natural languages then it should be able to be applied to second languages as well, since second languages are also human or natural languages. Secondly, as described later in this chapter, section 2.2.2, on the developments of theories and approaches in the 1970s and in chapter 3 on other studies on ESL, the discovery of the similarity in the order of acquisition of thirteen English grammatical morphemes by first and second language learners in the so-called Morpheme Order studies (Brown, 1973; De Villiers and De Villiers, 1973, for first language, and Dulay and Burt, 1973, 1974a, 1975; Bailey, Madden, and Krashen, 1974; Larsen- Freeman, 1976; Krashen, Butler, Birnbaum, and Robertson, 1978; Rosansky, 1976; Hakuta, 1974 and Schmidt, 1983, for second language) was a major impetus for researchers in SLA to consider taking on UG in their research field.

So far, research on SLA using UG has evolved around the most debated question as to whether or not UG is available to L2 learners, i.e. to establish whether the set of linguistic principles and parameters are fully or partially available to L2 learners. The question has inspired numerous studies on a range of second languages, far too many to name here. In coming up with answers to this question,

first language influence arose as an issue: why certain second language features can not be acquired easily or at all by learners of certain first language backgrounds. The newly arising question led to another approach to SLA: the Error Analysis approach.

2.3.1.3 Error Analysis

Chomsky's revolutionary approach to the study of language greatly stimulated researchers in the field of language acquisition to investigate the acquisition of language in young children. Klima and Bellugi (1966) found that young children learning any language had a strikingly similar language learning pattern. This pattern was seen in the children's going through similar stages of language development, using similar constructions to express similar meanings, and making similar errors. An example is of the negative structure: children learning their first language not only acquire this grammatical feature around the same age, but they also mark this feature in similar ways in all languages. For example, in English, the children first put the negative in either beginning or end of the sentence or phrase (*wear mitten no, not a teddy bear)*, then gradually moving it inside the sentence (*there not squirrels, I not crying).*

In addition to Klima and Bellugi's (1966) findings, there were other accounts of first language acquisition that showed interesting characteristics of child language and of children's learning capacity. Among these accounts were the well-known experiments by Berko (1958) and by psycholinguist Martin Braine (cited in Pinker, 1994: 281), where children were said to be resistant to corrections, and being able to create their own grammatical rules which do not necessarily correspond to those from adults.

Moreover, L2 teachers of the time also found that their experience in the classroom did not at all support Contrastive Analysis' predictions. Firstly, as shown in Hernández-Chávez's (1972) study of Spanish children learning English, different structures in the first and second languages were not necessarily difficult and similar constructions in the two languages were not necessarily easy to acquire either. And secondly, as reviewed by Richards (1974) on studies of learners' errors, the errors were not caused by interference from their first language.

These two factors - the convincing findings in first language acquisition research and the failed predictions of CA – turned researchers' and teachers' interest to the learners' errors themselves. The errors produced by L2 learners were then seen as resulting from a linguistic system in its own right. This brought about the *Error Analysis* (EA) approach, introduced by Corder (1967), which advocated to systematically investigating L2 learners' errors. Many EA studies reviewed in Richards' (1974) book strongly showed that most of learners' errors could not be traced to their first language, and that those grammatical features of the learners' first language which should have facilitated acquisition proved to be erroneous. Findings from other EA studies (Ellis, 1985) that looked into the proportion of learners' errors which could be first language transfer also revealed an enormous variation in the proportions of errors (ranging from 3% in Dulay and Burt's (1973) study to 51% in Tran's (1975) study), with a majority of these studies showing around one-third of all errors were traceable to learners' first language.

These findings left L2 researchers with a puzzle as to where learners' errors originated from. The puzzle, along with a growing interest in the learners' own language system, resulted in some considerably popular SLA theories and approaches in the 1970s and 1980s.

2.3.2 The 1970s and 1980s witnessed the continuing profound influence of Chomskyan linguistics and the development of other theories and approaches that helped establish SLA into an autonomous field of inquiry. The first approach which involved Corder (1967), Nemser (1971) and Selinker (1972), acknowledged that L2 learners' own language system, *Interlanguage*, is rule-governed and has its own underlying grammar different from that of the target language. Other theories of this period included the Monitor Model of Krashen (1977 - 1985), and the Acculturation-Pidginisation theory of Schumann (1978). We will be looking at these theories and approaches next.

2.3.2.1 Interlanguage Theory

The term 'interlanguage' was first used by Selinker (1972), and was preferred to Corder's (1967) 'transitional competence' and Nemser's (1971) 'approximative system'. It refers to the "interim grammars constructed by second-language learners on their way to the target language" (McLaughlin, 1987: 60). By this definition, 'interlanguage' is seen as a *system* in its own right; and it is a *dynamic* system in that it continuously develops along its way to the target language. Interlanguage theory, therefore, focuses on describing the linguistic phenomena occurring in learners' language in order to discover the underlying system. Accordingly, Interlanguage theory does not focus on language teaching, and, with the exception of Corder (1967), researchers working under its light also pay little attention to its implications for teaching.

Central to Selinker's (1972) thinking about interlanguage are the various *strategies* that L2 learners use in their learning process in order to understand the input and to make sense of their output. These learning strategies are said to give rise to the learners' system of interlinguistic rules – the interim grammar (Nemser, 1971) –

and consequently, to their errors in the target language. Examples of some of these errors by L1 English L2 French learners are listed in figure 2.2 below.

Figure 2.2: Some errors found in the speech of children in a French immersion classroom (from McLaughlin, 1987: 62).

Strategy	Structure	Example
Language transfer	English word order.	le *français* camp* (a French camp)
Overgeneralisation	Past tense form modelled on most common conjugation.	Il a *couré.* * (He ran)
Simplification	Use of one form (infinitive) for all tenses.	Le fille *mettre* du confiture sur le pain.* (The girl put some jam on the bread.)

Subsequent developments in Interlanguage theory, such as the findings of the ZISA project (Zweispracherwerb Italienischer, Spanischer und Portugiesischer Arbeiter; see Meisel, 1980; Meisel, Clahsen and Pienemann, 1981; Clahsen et al., 1983) that concerned the acquisitional sequence of German word order rules, have seen SLA researchers trying to find answers to the following issues:

. How systematic and how variable is learners' interlanguage?

. How does interlanguage develop?

. How much is transferred from the first language to the interlanguage?

In working with the first issue, researchers such as Hyltenstam (1977), Andersen (1978), Huebner (1979), Tarone (1983) and Ellis (1985), found that learners' interlanguage is systematic, regardless of their first language backgrounds, although there is also variability within and between learners in the acquisition process that they follow.

To find the answers to the second issue of interlanguage development, Ellis (1985) argued that since L2 acquisition involves learners sorting out the relationship between form (e.g. regular past tense *-ed*) and function (past time reference), interlanguage begins with form. Hatch (1978), on the other hand, suggested that learners first realise the need to interact and converse (function), then try to find and develop ways (forms) to fulfil the need; thus interlanguage begins with function. However, for Long and Sato (1984), both form-to-function and function-to-form analyses are important in providing an insight into the process of L2 acquisition.

From their findings of the ZISA project, Meisel et al. (1981) reconceptualised the two issues of interlanguage development and variability in a way that is substantially different from such accounts of SLA as of Tarone (1983) and Ellis (1985). Meisel et al. (1981: 119) developed the Multidimensional Model where the process of acquiring a second language was viewed "as a sequence of ordered developmental stages" and that "within each stage one will have to allow for considerable variation". This variation is marked by linguistic differences among learner groups which are hypothesised to stem from learners' socio-psychological differences. This new concept of a developmental dimension of SLA was, later on, furthered (in the sense that he provided a principled explanation) by Clahsen's (1984) account of the acquisitional sequence of German word order emerging from the ZISA study in terms of three speech processing strategies: Canonical Order Strategy (COS), Initialisation-Finalisation Strategy (IFS) and Subordinate Clause Strategy (SCS). Clahsen (1984) explained that the sequence of German word order rules was acquired in association with these strategies as shown in table 2.1 below:

Table 2.1: German word order rules and associated strategies (from Pienemann, 1998: 46)

Stage	Rule	Strategies		
X	Canonical order		+COS	+SCS
x+1	Adverb preposing	+IFS	+COS	+SCS
x+2	Verb separation	+IFS	-COS	+SCS
x+3	Inversion	-IFS	-COS	+SCS
x+4	Verb final	-IFS	-COS	-SCS

This table illustrates that learners use or adopt (+) processing strategies and successively shed these (-) when the latter are no longer needed because the requisite processing procedures for the structure have been acquired or developed.

Clahsen's (1984) strategies approach was said to have a "predictive power" in that it also applied to a further range of German word order structures (Pienemann, 1998: 47), and to Pienemann's (1998) PT and various hypotheses (such as Teachability Hypothesis) which claimed that processing strategies for a given stage of development build upon the strategies developed at the immediately preceding stage.

The third issue of transfer is closely related to the first two since it looks at the core of the performance (issue 2) variability (issue 1) between learners. Although studies on this third issue (Schachter, 1974; Jordens, 1977; Keller-Cohen, 1979; Schachter and Rutherford, 1979; Kellerman, 1979, Gass, 1979; Wode, 1981; Zobl, 1982; Schumann, 1982; Rutherford, 1982; Ard and Homburg, 1983) showed that first language transfer has left subtle and non-obvious effects on interlanguage development, the influence of L1 has always been there and is unpredictable.

2.3.2.2 The Monitor Model was the final result of a series of articles by Krashen in the late 1970s (1977, 1978, 1980), and refined in a number of his books in the first half of the 1980s (1981, 1982, 1985). As mentioned briefly in section 2.2.1.2 above, the Morpheme Order studies with their empirical findings on the order of acquisition of thirteen English grammatical morphemes by first and second language learners were seen as paving the way to the theoretical development of the Monitor Model.

The Monitor Model was based on Krashen's five central hypotheses:

a. the Acquisition-Learning hypothesis
b. the Monitor hypothesis
c. the Natural Order hypothesis
d. the Input hypothesis
e. the Affective Filter hypothesis

These five hypotheses will be briefly outlined in the order presented above.

a. The Acquisition-Learning hypothesis assumes a distinct difference between *acquisition* and *learning*. According to Krashen (1985: 1), acquisition is a "subconscious process" very similar to the process children employ in acquiring their first language, and learning is a "conscious process" that results in knowing about language. The definition emphasises the distinction between the two environments where language exposure and/or use take place: a naturalistic environment like that of children's first language acquisition, and a classroom environment where learners' attention is drawn to linguistic forms and rules. However, for Krashen (1977-1985), the more important issue is the distinction between conscious and unconscious attention to rules. The former (conscious attention to rules) normally takes place in a classroom environment, but can also

take place in a natural environment, such as a request for explanation of certain grammatical rules during adults' conversation. The latter (unconscious attention to rules) is normally achieved in a natural environment, but can also be achieved in the classroom setting, for example when focus is on meaningful communication. According to Krashen (1982: 83), learning does not "turn into" acquisition, i.e the linguistic knowledge which is consciously learnt cannot be considered as part of the acquisition process.

b. The Monitor hypothesis states that Monitor or editor is the only function that learning has, and learning is there only to make changes to our utterance, after it has been produced by the "acquired system" (Krashen, 1982: 15). This concept was used by Krashen to explain the differences among individual learners and implies important aspects of language teaching. According to Krashen, there are three types of language learners: the first one is called *over-Monitor users,* the second *under-Monitor users,* and the third *optimal-Monitor users*. The difference between these three types of language learners is due to the degree of self-monitoring that the learners set for themselves. The over-Monitor users' priority is their own performance, the under-Monitor users' main concern is to convey their own messages, and the optimal-Monitor users are in between these two: they use the Monitor when necessary.

c. The Natural Order hypothesis assumes that "we acquire the rules of language in a predictable order, some rules tending to come early and others late. The order does not appear to be determined solely by formal simplicity and there is evidence that it is independent of the order in which rules are taught in language classes" (Krashen, 1985: 1). This hypothesis is based on the findings of the Morpheme Order studies on first and second language learners, and will be described in detail in chapter 3. Apart from this assumption, Krashen also went on to claim that there

is no difference in the order of acquisition between learners whose exposure to the target language is mainly outside the language classrooms and the ones whose experience with the target language takes place mainly inside this setting. This natural acquisition order is said to be the product of the *acquired system.*

d. The Input hypothesis is determined by the natural order of acquisition as stated by Krashen (1985: 2), we acquire language in only one way, "by understanding messages, or by receiving 'comprehensive input' ... We move from *i*, our current level, to *i* + 1, the next level along the natural order, by understanding input containing *i* + 1." Considering this Input hypothesis as central to his Monitor Model theory, Krashen (1985: 2) explained that, (1) speaking is not the cause of acquisition, but is its result; and we cannot teach speaking directly but it emerges on its own as a result of building competence via comprehensive input; and (2) if there is enough comprehensible input, then necessary grammar is automatically provided. This relieves language teachers from attempting to teach the next grammatical structure along the natural order as the structure will emerge and be automatically monitored if the student receives a sufficient amount of comprehensible input.

e. The Affective Filter hypothesis is seen by Krashen as another important element in learners' successful acquisition of the target language. It helps determine which comprehensive input learners would take in and which they would not. According to Krashen (1982: 31), the Affective Filter is the key determiner in individual learners' differences, since it "captures the relationship between affective variables and the process of second language acquisition" by assuming that learners vary with regard to their strength or level of their affective filters. Those learners whose attitudes are not optimal for second language acquisition will not only tend to avoid new input, but they will also put up a high

or strong affective filter. Consequently, even if these learners understand the message, the input will not reach that part of their brain which is responsible for language acquisition or the Language Acquisition Device, in Chomsky's (1980) terms. By contrast, those learners with attitudes that are more conducive to second language acquisition will not only seek for more input, but will also lower or weaken their filter. The more open these learners will be to new input, the deeper the input will implant in their brain.

The Monitor Model since its induction has received copious criticisms from theoreticians and researchers but much less from language teaching professionals. These criticisms are based on the fact that the hypotheses are either not testable, such as the Acquisition-Learning distinction and the Input hypothesis, and/or not supported by empirical evidence such as the Monitor and the Natural Order hypotheses, or not provided with coherent explanation such as the Affective Filter hypothesis. By the same token, the Model's shortcomings have stimulated copious research and theories such as those on input and interaction (Long 1981, 1985, 1996) and output (Swain 1985, 1995), thus advancing our understanding of SLA.

2.3.2.3 The Acculturation or Piginisation Hypothesis proposed by Schumann (1978a, 1978b, 1978c) was another approach to second language learning that has left an ongoing influence on SLA since its introduction in the late 1970s. Based on his own longitudinal case study of the acquisition of English by Alberto, a 33-years-old Costa Rican (native Spanish) immigrant who hardly had any social and psychological contact with the target language community, Schumann (1978a) likened Alberto's interlanguage to that of *pidgins*, the languages that result from contact between traders and local people, containing elements of the local languages and those from the traders, and are used by the locals only. Alberto's interlanguage was characterised by linguistic simplifications and reductions such

as fixed word order and lack of inflections, which, according to Schumann, would lead to early *fossilisation* if the learner chose not to improve it. This fossilisation process is said to occur if only very little amount of *acculturation* to the host language environment is realised.

The subsequent decade after Schumann's (1978a, 1978b, 1978c) proposed L2 hypothesis, the 1980s, saw his socio-, psycholinguistic approach partly tested and extended in various studies and projects such as those from Klein (1981), Dittmar, (1982), Anderson (1983), and the ZISA project (Meisel, 1980; Meisel et al., 1981). The latest mentioned in particular, the ZISA project, has culminated in Processability Theory by Pienemann in 1998, the framework which this present study is based on, and which will be presented along with other SLA approaches in the next section.

2.3.3 The 1990s and beyond have witnessed the growth of SLA research into a more independent field of inquiry with a wealth of research that follows its own theoretical directions and methodologies. This autonomous status of SLA research also helps strengthen its existing links and establish new ones with other related fields. One of the newly established links that have broadened our understanding and knowledge of SLA is the 'revived' socio-cultural framework of Russian psychologist Vygotsky (1896-1934), whose learning theory increasingly interests many researchers and leads them to apply it to the field of SLA. Another link is with cognitive psychology where language processing models, such as that proposed by Processability theory, have also emerged. These two approaches, socio-cultural and cognitive, and their applications to SLA will be outlined in this section.

2.3.3.1 Vygotskyan Socio-cultural Theory was advocated first by Lantolf who, in the mid 1990s, edited two collections of papers that studied the application of various aspects of Vygotskyan principles to SLA (Lantolf, 1994; Lantolf and Appel, 1994). A further collection by Lantolf in 2000 documented ongoing work in this direction and was followed by surveys and continuous updates on the developments of the theory and research by others (Dunn and Lantolf, 1998; Swain et al., 2002).

According to Lantolf (2000: 80), "The central and distinguishing concept of sociocultural theory is that higher forms of human mental activity are *mediated*. Vygotsky (1987) argued that just as humans do not act directly on the physical world but rely, instead, on tools and labour activity, we also use symbolic tools, or signs, to mediate and regulate our relationships with others and with ourselves. Physical and symbolic tools are artefacts created by human culture(s) over time and are made available to succeeding generations, which often modify these artefacts before passing them on to future generations. Included among symbolic tools are numbers and arithmetic systems, music, art, and above all, language. As with physical tools, humans use symbolic artefacts to establish an indirect, or mediated, relationship between ourselves and the world. The task for psychology, in Vygotsky's view, is to understand how human social and mental activity is organised through culturally constructed artefacts and social relationships."

From this central concept of socio-cultural theory above, language is seen as a tool, a means of mediation; and from this viewpoint, learning is a mediated process, moreover, a socially mediated process as it involves *activity* between learners, peers, people, etc.

Among the key ideas in Vygotsky's socio-cultural theory, there are three principles that have been studied and applied extensively in SLA research: private and inner speech, activity theory, and scaffolding within the zone of proximal development. The roles of these three principles on SLA will be observed next.

a. Private speech is most seen in young children, as well-documented by child psychologists Piaget and Inhelder (1966). It is interpreted as evidence of children's egocentrism, the ability to see the world from their own viewpoint. For Vygotsky, private speech is the sign of children's ability to *regulate* their inner thoughts, and as they grow older, it becomes *inner speech*, an essential use of language without the need of outer articulation. In SLA, instances of private speech in children and adult learners have been recorded and analysed in such studies as by Itoh and Hatch (1978), Frawley and Lantolf (1985), McCafferty (1992, 1994), Anton and DeCamilla (1999), Ohta (2001), and most recently by Swain (2005). In all of these studies, learners were attached with an unobtrusive microphone so that all types of their language use including their private speech were recorded. The results of these studies, as concluded by Ohta (2001: 30-31), "suggest the power of engagement as a factor in L2 acquisition, as the data reveal instances in which linguistic affordances acted on by the learner in private speech are incorporated into the learner's developing linguistic system."

b. Activity theory was first developed by Leontiev (1981), one of Vygotsky's followers, and consists of proposals for conceptualising the social context within which individual learning process occurs. *Activity* in Vygotskyan point of view "is defined in terms of sociocultural settings in which collaborative interaction, intersubjectivity, and assisted performance occur ...", and is conceived as "containing a subject, an object, actions, and operations" (Donato and McCormick, 1994: 455) that we use in classrooms. Activity has to be goal-directed and should be

operated depending on the environments where it takes place. SLA researchers working under this belief such as Coughlan and Duff (1994), Platt and Brooks (1994, 2002), Roebuck (2000), McCafferty et al. (2001), found that activity favours learners towards task engagement, therefore encourages them to employ the target language to achieve their individual learning goals. "Achieving this transformation establishes a platform from which the individual changes from one who stumbles and searches for words to one who is motivated to solve a difficult problem using his or her emergent yet still imperfect linguistic system and other mediational tools." (Platt and Brooks, 2002: 393)

c. The zone of proximal development, as defined by Vygotsky (1978: 85), is "the difference between the child's developmental level as determined by independent problem solving and the higher level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers." This developmental span is said to be greatly facilitated and shortened if aided by a **scaffolding** process, the process whereby a more skilled individual or individuals will help and guide the less skilled ones to attend to the key features of the problem, and prompt them through successive steps towards solving it. The concepts of the zone of proximal development and of scaffolding within it have been explored by various SLA researchers in both formal and informal settings. Aljaafreh and Lantolf (1994), Nassaji and Swain (2000) examined these effects in talks between teacher or tutor and student. Donato (1994), Swain and Lapkin (1998), Lantolf (2000), Ohta (2000, 2001), Swain et al. (2002), looked at peer interaction during classroom activities. The findings of these studies were, as reported by Nassaji and Swain (2000: 49), "consistent with the Vygotskian sociocultural perspective in which knowledge is defined as social in nature and is constructed through a process of collaboration, interaction and communication

among learners in social settings and as the result of interaction within the ZPD [zone of proximal development]."

The above outline of some of Vygotsky's key concepts in learning and their applications to SLA pursued by numerous researchers since the 1990s have resulted in the current socio-cultural theory best named as 'neo-Vygotskyan' theory. Another approach reviewed in this section focuses on the factors that control the way in which L2 learners process for linguistic outputs: Processability theory. This theory along with its pedagogical implications is described next.

2.3.3.2 Processability Theory (PT) incorporates Levelt's (1989) model of speech production and Kaplan and Bresnan's (1982) Lexical Functional Grammar (LFG) theory. Levelt's (1989) model of speech production identifies a cognitive environment and psychological factors in language processing and language development that PT takes on. And Kaplan and Bresnan's (1982) LFG theory, similar to Chomsky's Principles and Parameters Approach, is also a theory of linguistic knowledge, but accords a higher priority to broad descriptive coverage, and to psychological plausibility for sentence processing. These two incorporated components in PT, Levelt's model of speech production and LFG, will be outlined below.

Levelt's (1989: 9) model of speaking:

In this model, after a series of activities happening in the speaker's *Conceptualiser*, such as conceiving an intention, selecting the relevant information, ordering this information for expression, keeping track of what has been said before, etc., the *Formulator* takes on the output of the Conceptualiser, the *preverbal message*, accepts fragments of messages as characteristic input and produces as output a *phonetic* or *articulatory plan*. In other words, "the Formulator translates conceptual structures

into a linguistic structure." (Levelt, 1989: 11) In this translation process, the Formulator does two things: *grammatical encoding* and *phonological encoding*. Since PT concentrates on the acquisition of procedural skills needed for processing grammatical properties of second languages, the *grammatical encoding* function in Levelt's (1989) model of the Formulator, is taken as PT's point of departure.

According to Levelt (1989), the *Grammatical Encoder* is made up of two types of procedures, one for accessing lemmas, and the other for building syntax. These two types of procedures correspond to two different types of knowledge in a speaker's mental scheme: declarative and procedural knowledge. A speaker's declarative knowledge has the *lemma information* of a lexical item or word. This information is for the lexical item's *meaning*, or concept, and its *lexical features*. To illustrate these two properties of a lexical item, I take from Levelt (1989: 11), the word *sparrow*, for example, meaning a special kind of bird, and the word *give* meaning "some actor X causing some possession Y to go from actor X to recipient Z". The lemma information of the word *give* is outlined in figure 2.3 below. Syntactically, the word *sparrow* is categorised as a *noun* and countable; and the word *give* is categorised as a *verb* which requires a subject representing the actor X, a direct object representing the possession Y, and an indirect object representing the recipient Z (e.g. *'John gave the sparrow some water.'*). The speaker's procedural knowledge is then called upon when a lemma is activated after its meaning matched part of the preverbal message. This process then activates the syntactic category part of the word, which in turn activates certain syntactic building procedures (Levelt, 1989: 11). In the example above, when the conceptual structure of the message activates the word *give* in the lexicon, the syntactic category *verb* will call the verb-phrase building procedure to build the verb phrase *'gave the sparrow some water'*. Similarly, when the conceptual structure of the message

activates the word *sparrow*, the syntactic category *noun* will call the noun-phrase building procedure to build the noun phrase '*the sparrow*', etc.

Figure 2.3 Lemma for '*give*' (from Levelt, 1989: 191)

---

give conceptual specification

CAUSE (X, (GOposs (Y, (FROM/TO (X, Z)))))

conceptual arguments: (X, Y, Z)

syntactic category: V

grammatical functions: (SUBJ, DO, IO)

relations to COMP: none

lexical pointer: 713

diacritic parameters: tense

aspect

mood

person

number

pitch accent

It is a speaker's *mental lexicon* which stores lemmata information that is defined by Levelt (1989: 181) as "an essential mediator" between the Conceptualiser and the Grammatical Encoder. It is also a lexical item's *conceptual arguments* which have to be **mapped** onto its *grammatical functions* in the process of language production that is identified by Kaplan and Bresnan (1982) as the main objective of a psychological plausible theory of grammar. For example, with the word *give*'s lemma information outlined above, its conceptual arguments X, Y, Z are assigned certain *thematic roles* such as *agent* for X, *theme* for Y, *goal* for Z, and one of the possible mappings with its grammatical functions is,

X (agent), Y (theme), Z (goal)

| | |

SUBJ DO IO

Kaplan and Bresnan's (1982) Lexical Functional Grammar (LFG) theory identifies three related levels of representation in any linguistic structure: *argument representation* (or argument structure, a-structure), *functional representation* (or functional structure, f-structure) and *constituent (formal) representation* (or constituent structure, c-structure). The core idea in this descriptive coverage of linguistic knowledge is that lexical items specify information (in the form of 'lexical features' as presented above in Levelt's (1989) model of speaking) that ensures the mappings between the three structures (c-structure, f-structure, and a-structure) following the principles of well-formedness. It is the idea of **mapping** the lexical features of a linguistic structure onto the same feature-set in its f-structure that is the fundamental mechanism by which **feature unification**, one of the most important arguments in LFG, is implemented. Lexical features that are mapped onto the same locations in the f-structure must have the same value otherwise the mapping will fail. According to Pienemann (1998: 73), "the unification of lexical features, which is one of the main characteristics of LFG, captures a psychological plausible process that involves (1) the identification of grammatical information in the lexical entry, (2) the temporary storage of that information and (3) its utilisation at another point in the constituent structure." This claim from LFG about the ways in which information is shared in order to map conceptual arguments or meaning to constituent structure makes it compatible with PT, a processing model of language production and acquisition, where the cognitive demands made by different types of information exchange are seen as related to a natural acquisition order. In PT, the ability to successfully unify features is used as a measurement of learners' acquisition of processing procedures. Thus PT postulates a universal

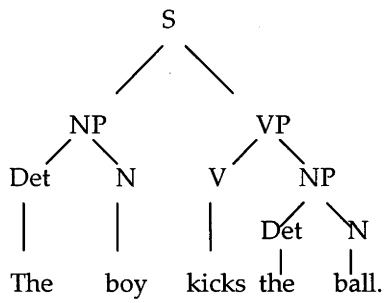
acquisition hierarchy of processing procedures in which the acquisition of less complex procedures are the requisite for that of more complex ones:

- Stage 1: Lemma access: words; no sequence of constituents;
- Stage 2: Category procedures: lexical morphemes; no exchange of information – canonical word order;
- Stage 3: Phrasal procedures: phrasal morphemes;
- Stage 4: Simplified Sentence procedure: exchange of information from internal to salient constituent;
- Stage 5: Sentence procedure: inter-phrasal morphemes; exchange of information between internal constituents.
- Stage 6: Subordinate clause procedure.

This hierarchy of processing stages or procedures is held to be "universal" (Pienemann, 2003: 687) for it follows the order of speech processing increments in native speakers hypothesised by Kempen and Hoenkamp's (1987) Incremental Procedural Grammar, from which Levelt's (1989) model of speaking described above is derived.

In PT's view (Pienemann, 1998: 80), "the hierarchical nature of this list arises from the fact that the procedure of each lower level is a prerequisite for the functioning of the higher level: a word needs to be added to the L2 lexicon before its grammatical category can be assigned. The grammatical category of a lemma is needed before a category procedure can be called. Only if the grammatical category of the Head phrase is assigned can the phrasal procedure be called. Only if a phrasal procedure has been completed and its value is returned can Appointment Rules determine the function of the phrase. And only if the function of the phrase has been determined can it be attached to the S-node and sentential

information be stored in the S-holder." To illustrate this premise is the following English sentence tree structure:



Learners are supposed to move up this sentence tree structure by first accessing separate words, stage 1 (the, ball ...), and their lexical features or syntactic categories, stage 2 (Det - Determiner, N - Noun ...), then joining them into phrases, stage 3 (NP - noun phrase, VP – verb phrase ...), then exchanging/unifying third-person-singular information between phrases, stage 5 (The boy kicks ...) via the S-node which represents the complete sentence.

This hierarchical processing model has been applied to a range of developmental phenomena (in both morphology and syntax) that have been observed in such languages as German (Pienemann 1980, 1981, 1987; Jansen 1987, 1991, 2005, 2008; Boss 1996; Håkansson, Pienemann and Sayehli 2002), English (Johnston 1985, 1997; Dyson, 2004), Swedish (Pienemann and Håkansson 1999, Håkansson, Norrby and Bruzaeus, 2005), Swedish, Norwegian and Danish (Glahn, Håkansson, Hammarberg, Holmen, Lund and Hvenekilda, 2001), Japanese (Kawaguchi 1996, 2002), Arabic (Mansouri, 2002), Italian (Di Biase, 2002) and Chinese (Zhang 2001; Charters 2005). As the focus of the present study is on ESL, it is appropriate to review here PT's prediction of the hierarchical acquisition of English morphology and syntax, which was investigated in the work of Johnston (1985) and of Pienemann and Mackey (1993). Table 2.2 below gives an overview of PT's processability hierarchy for English.

Table 2.2 Processing procedures applied to English (adapted from Pienemann, 1998: 171)

Stage	Processing procedure	Exchange of information	L2 process	Morphology syntax
6	Subordinate clause procedure		Main and subordinate clause	Cancel Inversion
5	S-procedure/ - saliency	Inter-phrasal	Subject-Verb agreement (= 3sg-s)	Do2nd, Aux2nd
4	S-procedure/ + saliency	Inter-phrasal		Yes/No inversion, Particle Shift
3	Phrasal procedure	Phrasal	Noun phrase (NP) agreement	Adverb, Do-Front, Topicalised, Neg+V
2	Category procedure	Lexical morpheme	Plural, Possessive pronoun	Canonical order
1	Word/lemma	'words'	Invariant forms	Single constituent

Below are some examples of these processing structures, adopted from Pienemann, (1998: 169-172).

Table 2.3: Examples of English structures

Stage	Syntax	Examples	Morphology	Examples
6	Cancel inversion	*I wonder what she is eating.*	-	-
5	Do2nd Aux2nd	*Why did he buy that?* *Where has he gone?* *What is she eating?*	S-V agreement (= 3sg-s)	*He owns....*
4	Y/N inversion	*Has he seen you?*	-	-
3	Wh-fronting Do-fronting	*Where you have been?* *Do he like it?*	NP agreement Possessive -s	*two dogs* *Mary's dog*
2	Canonical order	*They kick the ball.*	Lexical Plural Possessive pronoun	*I like dogs.* *My house*
1	Single words Formulae	*Hello!* *How are you?* *Thank you.*		

Thus, for ESL and in the context of this thesis, PT hypothesizes that the nominal plural morpheme -s as in the utterance "*I like dogs.*" is mapped directly from the conceptual structure (via the noun lemma) onto the form "*dogs*", while in "... *two dogs*" the plural value of a number feature in the lemma *two* has to be unified with the value of the same feature expressed in the lemma *dogs*. Accordingly, PT predicts that learners of English should be able to produce the form "*dogs*" without a quantifier, before they are able to produce the form "*two dogs*", or "*Mary's dog*", in the case of a possessive, because the latter requires unification and the former does not. Similarly, the feature unification requirement in English Subject-Verb agreement as in the utterance "*He owns two dogs*" is considered more costly than that in the Quantifier-Noun (or Possessive -s) agreement, as the feature values in the former have to be matched across the constituent boundaries, i.e. the VP and the NP, while those in the latter are processed within a single constituent, the NP. The phrasal plural -s and the possessive marker on a noun are therefore predicted to emerge before the inter-phrasal -s marker on a verb. In short, PT predicts the following acquisition hierarchy of the three processing procedures:

Lexical	<	Phrasal	<	Inter-phrasal
Bare N-plural	<	Quantified N-plural/ Possessive -s	<	Verbal 3rd-ps-sg
eg: "... *dogs*"	<	"*two dogs*" "*Mary's dog*"	<	"*He owns* ...."

Together this prediction on the English formative -s forms part of the Procedural Skill Hypothesis that the present study aims at testing.

2.4 Conclusion

In this chapter, the evolution of theories and approaches to SLA since post-war has been presented. The presentation focussed on this evolution more through time, than by the research tradition. A time span of nearly five decades since the 1950s until now has seen a wealth of theories and approaches on SLA: from the Contrastive Analysis in the 1950s to the Neo-Vygotskyan and Processability Theory in the late 1990s and early 2000s, from Behaviourism to Socio-cultural approach, and from considering learners as mechanical objects just to take in stimuli and return responses to recognising learners as all-rounders whose "diverse voices, intentions, motives, and personal histories are not lost but are acknowledged and brought to the forefront of scientific inquiry" (Johnson, 2004: 16). The chapter serves the purpose of demonstrating how SLA has laid the theoretical foundations for this thesis, and how Processability Theory (Pienemann, 1998), a cognitive approach with its processing prediction, has been chosen as the theoretical framework within which the present study operates. As the aim of this thesis is to investigate if the acquisition of the English inflectional morpheme –s by Vietnamese learners of EFL follows the hierarchical order predicted by PT's Procedural Skill Hypothesis (Pienemann, 1998), it is necessary to account for the other studies that have tackled similar features during the similar time span of theories and approaches in the cognitive tradition. This account is given next, in chapter 3.

"'Interesting as all these theoretical papers are, without studies of language acquisition, they can only be speculative."

Hatch (1978: 10)

CHAPTER 3

STUDIES ON ACQUISITION OF MORPHOLOGIES OF ENGLISH AS A SECOND LANGUAGE

3.1 Chapter Overview

From theory to practice, this chapter narrows down the scope of the present study. The purpose of this chapter is to present the reader with other ESL studies from both the same and different paradigms with which the present study is contrasted. As the present study is about the acquisition of the *procedural skills* needed for the processing of the English nominal and verbal morphology –s, in this chapter, the reader is taken, again through time, to look at a number of studies on the acquisition of similar or other morphologies in the last three and a half decades. In this chapter, the temporal approach to looking at previous studies serves the purpose of positioning the present study within the context of SLA research. These studies were either cross-sectional or longitudinal, and will be described in the next three sections of the chapter.

The first section, section 3.2, describes those studies in the 1970s which were often referred to as the *morpheme order studies*. Section 3.3 documents the studies in the 1980s; and section 3.4 looks at the most recent studies which include Jia's (2003) study of the acquisition of the English plural morpheme by Mandarin Chinese-speaking children, and that of Johnston (1997) and of Dyson (2004), who are both proponents of Processability Theory. The last section of the chapter, section 3.5, provides a short critique of these studies prior to and paving the way for the present study.

3.2 ESL Morpheme Studies in the 1970s

The 1970s second language (L2) morpheme order studies were motivated by the work of Brown (1973) in first language (L1) acquisition, which was briefly mentioned in chapter two, section 2.2.1.2. Researchers in SLA set out to establish whether L2 learners acquired English grammatical morphemes in the same order as in Brown's (1973). The first of these researchers were Dulay and Burt (1973, 1974a, and 1975) who investigated the acquisition order of ESL morphemes in a series of three studies.

3.2.1 Dulay and Burt (1973, 1974a, 1975)

Dulay and Burt's (1973) rationale for undertaking a series of cross-sectional studies on the natural sequences of acquisition of certain English grammatical morphemes in children learning ESL was not entirely inspired by Brown's (1973) work. In their previous study in 1972, these two authors took on the error analysis approach and found that regardless of their L1 background, children made similar errors and error types in their process of learning English. This finding prompted the two researchers to an "existence of second language learning strategies common to all children" (Dulay and Burt, 1974a: 37) which they referred to as "creative construction", a process that they believed being guided by "universal innate mechanisms", thus a Chomskyan UG approach.

Having been encouraged by their own 1972 study's results, Dulay and Burt (1973) were also stimulated by the results of Brown's (1973) study on the order of acquisition of 14 English grammatical morphemes by English speaking children. Their argument was that "if it is true that universal cognitive mechanisms (or strategies) are the basis for the child's organization of a target language, and if it is the L2 system rather than the L1 system that guides the acquisition process, then the general sequence in which certain English syntactic structures are acquired by

children of different language backgrounds should be the same, with only minor individual variation" (Dulay and Burt, 1974a: 38).

To begin their quest in this direction, in 1973 Dulay and Burt undertook a pilot cross-sectional investigation of the acquisition order of eight English grammatical morphemes for 151, six to eight years old, Spanish-speaking children learning ESL. The eight morphemes were article (a, the), contractible copula (be), contractible auxiliary (be), plural (noun–s) [1], irregular past (ate, took), progressive (verb–ing), possessive (noun-'s) and 3rd-person-singular (verb-s). The children were Chicanos, Mexicans and Puerto Ricans living in Sacramento (California), Tijuana (Mexico), and New York City respectively. These children were also different in terms of their length of exposure to English in the USA.

To collect the children's natural speech, Dulay and Burt (1973) designed and used the Bilingual Syntax Measure (BSM), a structured conversation elicitation technique based on cartoons and a set of questions in English and Spanish. Subjects' acquisition of the morphemes was measured by the percentage of correct suppliance in obligatory syntactic contexts of the grammatical morphemes studied. Following Brown (1973), this percentage was set at 90% of the obligatory contexts. For example, if subjects produced the plural morpheme –s in at least 90% of the cases when the context required a plural noun, they were considered as 'acquired' the morpheme.

Although the order found in Dulay and Burt's (1973) study was not the same as that found in Brown's (1973) L1 study (table 3.1), the order of acquisition of the eight grammatical morphemes was similar in the three groups of children. Dulay

---

[1] This *plural (noun-s)* covered both lexical- and phrasal-plural –s in PT's (Pienemann, 1998) terms.

and Burt (1973: 256) concluded that the results of their study provided "independent evidence that the strategies of second language acquisition by children are universal", and that "the learning order of these structures is controlled by the child's processing strategies, in the sense that he must be cognitively 'ready' in order to acquire any of them." Accordingly, these two researchers suggested that language teachers should not teach children syntax, but rather "leave the learning to the children and redirect our teaching efforts to other aspects of language." Dulay and Burt (1973: 257)

Table 3.1 Acquisition order of eight morphemes from Brown's (1973: 274) and Dulay and Burt's (1973: 255) studies.

First language learners (Brown, 1973)	**Second language learners (Dulay and Burt, 1973)**
1. Progressive (-ing)	1. Plural (-s)
2. Plural (-s)	2. Progressive (-ing)
3. Past irregular	3. Contractible copula BE
4. Possessive ('s)	4. Contractible auxiliary BE
5. Articles (a, the)	5. Articles (a, the)
6. 3rd person regular	6. Past irregular
7. Contractible copula BE	7. 3rd person regular
8. Contractible auxiliary BE	8. Possessive ('s)

Following the results of their 1973 pilot study, in 1974, these two researchers carried out a similar cross-sectional study with children from two different L1 backgrounds and on eleven English structures. Their subjects were 60 Spanish-speaking children in Long Island, New York, and 55 Chinese-speaking children in Chinatown, also in New York, total 115. Subjects' age range was also from six to eight years old. The tested grammatical structures were the eight from their 1973

study plus pronoun case (nominative and accusative), regular past (-ed) and 'long' plural (-es e.g *horses* as opposed to 'short' plural –s in *books*) [2].

The same Bilingual Syntax Measure (BSM) method was used to collect the children's natural speech; this time the set of questions was totally in English. Apart from the two analysis methods adopted from Brown's (1973) study and used in their 1973 study, namely the obligatory context and the scoring of obligatory context, in this 1974 study, Dulay and Burt developed three more, different data analysis methods which they claimed allowed them to report their results "with confidence" (Dulay and Burt, 1974a: 43). These three methods were Group Score, Group Means and Syntax Acquisition Index (SAI), which were calculated based on individual children's scores of suppliance in obligatory contexts.

The results obtained from these data analysis methods (table 3.2), according to Dulay and Burt (1974a: 49-50), showed that (1) "the sequence of acquisition of 11 functors obtained for Spanish and Chinese children are virtually the same", and (2) that the sequence "provides strong evidence that children exposed to natural L2 speech acquire certain structures in a universal order." Dulay and Burt (1974a: 52) argued that these results were further supported by the fact that "the grammar of the 11 functors is widely different in Chinese and Spanish and both differ from English in certain ways." An example of this is, Dulay and Burt (1974a: 52) continued, "Chinese does not express Copula at all, while Spanish does, yet both Chinese and Spanish children acquire Copula at about the same point in the sequence. Spanish plurals are expressed exactly as plurals are expressed in English; yet plurals appear midway in the acquisition sequence ..."

---

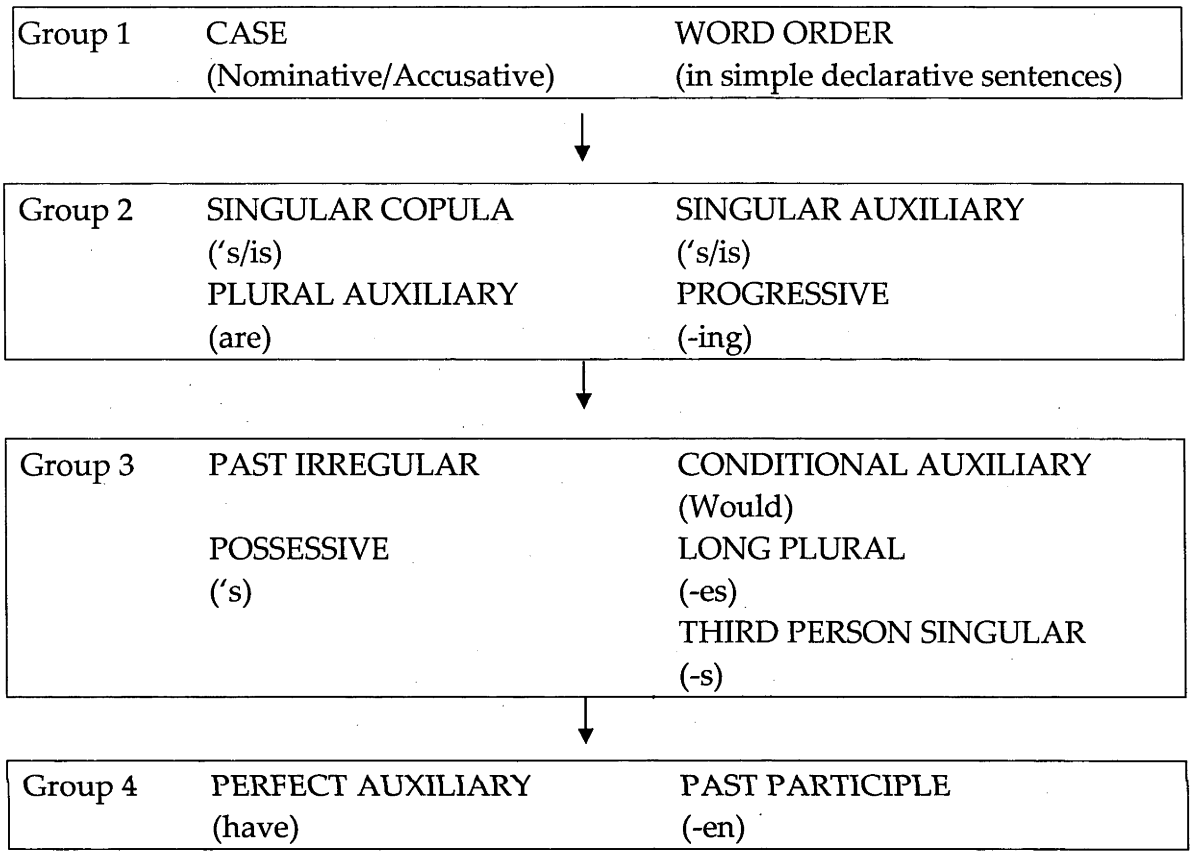
(2) The *short* and *long plural* distinction is irrelevant to PT (Pienemann, 1998) and the present study but perhaps relevant to future research.

Table 3.2 English morphemes order acquired by Spanish & Chinese L1 children (from Dulay and Burt, 1974a: 49)

Group Score Method	Group Means Method	SAI Method
1. Case	1. Case	1. Case
2. Article	2. Article	2. Copula
3. Copula	Copula	Article
4. –Ing	-Ing	-Ing
5. Plural	5. Plural	5. Auxiliary
6. Auxiliary	6. Auxiliary	6. Plural
7. Past-reg	7. Past-reg	Past-irreg
8. Past-irreg	Past-irreg	Possessive
9. Long Plural	Possessive	Past-reg
10. Possessive	10. Long Plural	Long Plural
11. 3rd Person	11. 3rd Person	3rd Person

To further confirm these results, in 1975, Dulay and Burt expanded their cross-sectional study to 536 children of five to nine years old, involving 461 Spanish-speaking and 55 Chinese-speaking children of different levels of English proficiency. The number of morphemes studied this time also increased from eleven in the 1974 study to the thirteen of Brown's (1973) original list. They found a clear acquisition hierarchy and were able to group the acquired morphemes in a sequence as shown in figure 3.1 below. Dulay, Burt and Krashen (1982: 207) concluded "it is highly probable that children of different language backgrounds learning English in a variety of host country environments acquire the grammatical morphemes in a similar order."

Figure 3.1 Acquisition hierarchy for 13 English grammatical morphemes for Spanish- and Cantonese-speaking children (Source: Dulay, Burt and Krashen, 1982: 208)



3.2.2 Bailey, Madden, and Krashen (1974)

Shortly after Dulay and Burt's second study in 1974, Bailey, Madden and Krashen conducted a similar cross-sectional study with adult learners of ESL. These researchers used the same BSM method to elicit the eight morphemes studied in Dulay and Burt's first study (1973). Their subjects were 73 adult learners, aged 17 to 55, and from eleven different L1 backgrounds: Spanish, Greek, Persian, Italian, Turkish, Japanese, Chinese, Thai, Afghani, Hebrew, Arabic and Vietnamese, among whom, 33 were Spanish. The results of these authors' 1974 study showed that, (1) there was a similarity in the relative accuracy of production of the eight morphemes between the Spanish and non-Spanish speaking groups; and (2) the

relative accuracy in adults were similar to that in children obtained by Dulay and Burt's first and second studies (1973, 1974a).

The consistent findings from Dulay and Burt's (1973, 1974a, 1975) and from Bailey, Madden and Krashen's (1974) studies suggested a set-ordered development of a number of grammatical morphemes in both child and adult learners of ESL, regardless of their L1 backgrounds. The findings also suggested that the development was systematic, was guided by certain internal principles that were mostly independent of learners' L1, and followed a similar sequence as in L1 acquisition. This suggestion motivated other SLA researchers in a quest for more solid evidence on how L2 was acquired.

3.2.3 Hakuta (1976) was the first researcher who attempted to use Brown's (1973) L1 *longitudinal* methodology with a L2 learner, a five-year-old Japanese girl, named Uguisu, learning ESL in the United States. Thirty data samples from Uguisu's spontaneous speech were collected over a period of 60 weeks, and 17 grammatical morphemes were studied.

The acquisition criteria established by Brown (1973) were used in Hakuta's (1976) study, i.e 90% of correct suppliance in obligatory syntactic contexts of the grammatical morphemes studied. The methodology used to analyse Uguisu's speech data, also established by Brown (1973), is the mean length of utterance (MLU), where language acquisition data was divided into a number of stages. Within each of these stages, the language acquired is said to have certain characteristics that seem to be consistent among children. The acquisition order of these morphemes and their forms is shown in table 3.3 below.

Table 3.3 Acquisition order of the morphemes studied by Hakuta (1976: 334)

Morpheme	Forms
Present Progressive	-ing
*Past Auxiliary	didn't
3rd Person Irregular	has, does
*Preposition	In
Preposition	To
Past Progressive Auxiliary	Was
Preposition	On
*Past Auxiliary (Interrogative)	Did
*Present Auxiliary (Negative)	doesn't
Possessive	's
Copula	be, am, is, are
Auxiliary (Progressive)	be, am, is, are
Articles	a, the
3rd Person Regular	-s
Past Irregular	went, came
Past Regular	-ed
Plural	-s

*Morphemes not scored by Brown (1973)

Although the acquisition order of these morphemes in Hakuta's (1976) study was slightly different from that of Brown (1973), and of Dulay and Burt (1973), the most important result from Hakuta's (1976) study, plus those reviewed earlier in this section, was that the acquisition of the above-listed English grammatical morphemes by first and second language learners was similar in the sense that it took place *successively*.

The application of Brown's (1973) methodology was not Hakuta's (1976) aim for his study, but it certainly led him to an interesting result which made it possible to compare the acquisition order between L1 and L2 learners, and to a discussion on the differences between L1 and L2 acquisition. Moreover, Hakuta presented the notion of a *simplicity principle*, where frequent regular grammatical forms (e.g past tense) were acquired earlier than the irregular and the infrequent regular ones, as one way of accounting for the data produced by his subject as opposed to Brown's (1973).

3.2.4 Larsen-Freeman (1975, 1976)

Following Dulay and Burt (1973, 1974a, 1975) and Bailey et al. (1974), Larsen-Freeman (1975, 1976) extended these authors' studies by carrying out her own to measure and compare frequencies in input and output data, and determine if frequency might be an explanation for the order in which those eleven grammatical structures were acquired. To collect her data, in addition to the BSM, Larsen-Freeman (1975, 1976) used four more tasks – reading, writing, listening and repeating. Larsen-Freeman's subjects were 24 adult learners of ESL, coming from four linguistic backgrounds – Arabic, Japanese, Persian and Spanish, each group had six subjects. The data collected were scored for morpheme suppliance in obligatory contexts as in Brown's (1973) study, and the Group Score Method used in Dulay and Burt's (1974a) study was administered to order the morphemes.

The results of Larsen-Freeman's study confirmed the findings from Dulay and Burt (1973, 1974a, 1975) and from Bailey et al. (1974) in that L1 did not impact on the order ESL learners acquiring the morphemes. Although Larsen-Freeman (1975, 1976) did find that there were some differences in the order for different tasks, these differences were not significant.

3.2.5 Rosansky (1976)

The main purpose of Rosansky's (1976) study was to ascertain the validity of the elicitation instrument BSM used in the above-mentioned cross-sectional studies. Accordingly, Rosansky (1976) undertook a longitudinal analysis in his study on monthly samples of data collected through *spontaneous* speech of six untutored Spanish learners of ESL over a ten months period. The eleven English morphemes examined in Dulay and Burt's (1974a) study, were retested here. Dulay and Burt's (1974a) methods of scoring the morphemes including the Group Scores and Group Means were reused in Rosansky's (1976) study.

Contradicting his hypothesis that the morphemes rank order obtained from his subjects' spontaneous speech data would *not* correlate with that obtained from the BSM in Dulay and Burt's (1974a) study, the results of Rosansky's (1976) study showed that his morpheme order *did* correlate not only with that of Dulay and Burt (1974a), Bailey et al. (1974) and Larsen-Freeman (1975), but also with the order De Villiers and De Villiers (1973) found in their cross-sectional study of FL acquisition.

3.2.6 Krashen, Butler, Birnbaum, and Robertson (1978)

Inspired by the results of Larsen-Freeman's (1975) work, Krashen et al. (1978) conducted a study on 70 adult learners of four different L1 backgrounds, using only two writing tasks. Both writing tasks were free composition, but one was limited in time and the other was not. These researchers found that there was no difference in the accuracy order of the studied morphemes between the two writing tasks, and the orders obtained from both writing tasks were also the same as those obtained from the BSM tasks in Bailey et al. (1974). Krashen et al. (1978) concluded that since their subjects focused on 'communication' in both writing

tasks, a 'natural order' occurred, and that the processes involved in L2 acquisition was the same in both oral and written performance.

3.3 ESL Morpheme Studies in the 1980s

3.3.1 Schmidt (1983)

Schmidt's (1983) longitudinal case study of the development of the nine English grammatical morphemes, in a Japanese adult over a period of three years was one of the attempts of the time to provide evidence for Schumann's (1978a, 1978b, 1978c) *acculturation hypothesis* in SLA (chapter 2, section 2.2.2.3). The nine morphemes are the copula BE, progressive ING, auxiliary BE, past irregular, plural, 3rd person singular, article, possessive and past regular. Schmidt's (1983) subject was a 33-year-old artist, native speaker of Japanese with the name Wes, who migrated from Tokyo to Hawaii, Honolulu, in late 1977. Wes's main consideration for moving to the United States was for his artistic career as he was a successful artist in Japan with international reputation and Honolulu "is a significant international art market" (Schmidt, 1983: 140). Wes's English knowledge and competence was very minimal when he first arrived in Hawaii. However being described as "an extremely friendly and outgoing person" and by "steadily increasing demands on Wes's ability to communicate in English" (Schmidt, 1983: 140) because of his career market, Wes had to interact with many English speakers, thus had wide social contacts.

The three-years period that Schmidt (1983) observed Wes' English development was from June 1978 to June 1981, soon after Wes' arrival in Honolulu, and during which time Wes traveled back and forth between Hawaii and Tokyo. The main source of data for Schmidt's (1983) analysis was Wes' 18 self-recorded tapes made during his trips back to Tokyo, which had the advantage of being authentic and meaningful but also had a major disadvantage of being "monologues" (Schmidt,

1983: 145). Another source of data for Schmidt's (1983: 145) study was limited recordings of Wes' informal conversation with native speakers in Honolulu, and extensive but irregular field notes from Schmidt himself during the entire observation period.

The accuracy order for the nine grammatical morphemes, obtained by Schmidt (1983) from Wes' first and last monologue tapes recorded in July 1978 and November 1980, is presented below in table 3.5 below.

Table 3.4 Wes' Accurary Order of nine morphemes (Schmidt, 1983: 146)

Morpheme	July 1978	November 1980
1. Copula BE	Acquired, present only	No change
2. Progressive ING	Acquired (?)	No change
3. Auxiliary BE	Acquired (?)	No change
4. Past irregular	25%	55%
5. Plural	5%	43% / 33%
6. 3rd singular	0%	21%
7. Article	0%	19% / 6%
8. Possessive	0%	8%
9. Past regular	0%	0%

Wes's inability to improve his host language despite being a good candidate for doing so in terms of 'acculturation' was a blow to Schumann's (1978) acculturation model in SLA. According to Schmidt (1983: 170), "the factors which appear to best explain Wes's failure to acquire much grammar are therefore partly psychological, but these have less to do with social or psychological distance from target language speakers than with cognitive style, personality characteristics, and

attitudes which are specifically relevant to learning the grammatical code. While the acculturation model predicts that such factors will interact with acculturation but will not dominate it (Schumann, 1978: 48), this appears to have happened in Wes's case."

3.3.2 Pica (1983)

Still within the scope of researching the accuracy/acquisition order of the set of English morphemes obtained by the above-mentioned studies but with a slightly different perspective was Pica's (1983) study. To test if the accuracy/acquisition order of English morphology was also held between *instructed* and *naturalistic* learners, Pica (1983) conducted a study on 18 adult native speakers of Spanish, aged 18 to 50, under three different conditions: instruction only, naturalistic only, and a mix of instruction and naturalistic. There were equally six learners in each group, and these learners were at mixed levels of English proficiency. The data was collected through audio-taped, unplanned conversations with the researcher.

The results from Pica's (1983) study showed that, in comparison with the 'natural accuracy order' of the 8 morphemes obtained by Krashen (1977b), there was no statistically significant difference in the acquisition order between Pica's (1983) instructed and naturalistic learners. These results are shown in table 3.6 below. However, Pica's (1983) study did provide evidence to suggest that if learners have access to formal instruction, they will perform more accurately on some grammatical features, for example, Pica (1983) found that the plural morpheme –s was performed more accurately by instructed learners than by naturalistic ones, while the latter performed better with the progressive morpheme –ing, and no performance difference between the two groups for the articles. To explain these results, Pica (1983: 488) suggested that formal instruction might play a role in learners' acquisition of "easy-to-learn" morphemes such as the plural –s and the

3r-person-singular –s, "because of their transparent form-function relationship", and in inhibiting their production of ungrammatical constructions.

Table 3.5 Pica's rank order of each group of subjects and Krashen's (1977b) natural order (from Pica, 1983: 479)

Morpheme	Krashen's natural order	Instruction Only	Naturalistic	Mixed
Progressive –ing	1	1	1	1
Plural –s	2	3	5	4
Singular copula	3	2	2	2
Progressive auxiliary	4	5	4	6
Article	5	4	3	3
Past irregular	6	6	6	5
Past regular	7	8	7	7
Third person singular	8	7	8	8

3.3.3 Young (1986)

Within the research paradigm of studies of morphological acquisition orders in L1 and SLA, and similar to Larsen-Freeman's (1975, 1976) study of morphological variation across tasks discussed in section 3.2.4 above, Young (1986) conducted a cross-sectional study of the effect of interlocutor on the production of nine morphemes in the speech of six intermediate-level adult learners of ESL from mixed L1 backgrounds. The nine morphemes are copula BE, definite and indefinite articles, plural –s, irregular past, regular past, progressive –ing, 3rd-person-singular, progressive auxiliary BE. The interviewers were native speakers of English and non-native speakers from L1 backgrounds that were different from those of the learners but of a similar level of English proficiency. Each learner was asked to talk to one native interviewer and one non-native interviewer for 20 to 30

minutes on topics concerning his/her life in the US and the differences between life in his/her home country and life in the US.

The results of Young's (1986) study showed that learners' accuracy scores for the nine morphemes were higher in conversations with a native speaker than with a non-native speaker, 63.8% compared with 54.9%. Furthermore, when considering the accuracy scores for each of the nine morphemes separately, Young (1986: 108) also found that the bound morphemes (plural –s, irregular past, regular past, progressive –ing, 3rd-person-singular) and the free morpheme progressive auxiliary BE, tended to attain higher level of accuracy, and in the order as cited above, in conversations with native speakers than the other three free morphemes (copula BE, definite and indefinite articles).

These results had led Young, in 1991, to further study the acquisition of the plural –s in the speech of 12 adult Chinese speakers of ESL at mixed levels of English proficiency. This later study of Young will be discussed in chapter 4.

3.4 ESL (Morpheme) Studies in the 1990s and beyond

This section relates to the more recent studies, that of Johnston (1997), Jia (2003) and of Dyson (2004). Although Johnston's and Dyson's studies did not aim particularly at investigating the accuracy/acquisition order of English morphemes, they did cover those morphemes that the above-discussed studies and the present study focused on. Since these two studies originated from the same theoretical framework - Processability Theory (PT) (Pienemann, 1998) - as the present study, it is most appropriate to review their work in greater detail here.

3.4.1 Johnston (1997)

Johnston's (1997) study was the first to test the application of PT to ESL. The purpose of Johnston's (1997) study was "to describe the processes whereby the rules governing given aspects of the syntax of English are learnt, and if possible, to determine what sorts of universal constraints govern the sequence in which these rules are learnt" (Johnston, 1997: 109).

The study was based on a cross-sectional foundation with a longitudinal "superstructure" (Johnston, 1997: 112) where a small number of subjects involved in the cross-sectional study was chosen for follow-up interviews. Subjects were 12 Polish and 12 Vietnamese adult learners of ESL in Australia, with an unequal number of males and females in the Vietnamese group. Eight subjects from this cross-sectional sample were involved in the longitudinal part of the study with up to five times interviews in the year following the main interviews for the cross-sectional study.

Unstructured interviews were the primary tools used for data collection in Johnston's (1997) study and were conducted in two rounds with approximately one hour of interviewing for each subject per round. In the first round, only unstructured interviews were conducted, however in the second round more structured interviews and a series of tasks were used with the aim of obtaining more needed grammatical structures from subjects' speech production.

Johnston's (1997: 36-37) data analysis method was to count the number of the items or structures under study, and let them fall into his so-called "quasi-implicational patterns" which would be adduced as evidence for his informants' developmental sequences. Johnston's (1997: 36-37) rationale for such methodological decisions was that, "in second language acquisition research, ... , analytical techniques have

sometimes become the masters, rather than the servants, of enquiry." As a result, Johnston (1997: 37) claimed that his study "is unlikely to suffer from an excess of research technology."

Before briefly presenting the specific results of Johnston's (1997) study, it is necessary to include here a very short explanation of the use of implicational scaling (also known as implicational analysis, implicational or Guttman scales) in SLA research. This method for analysing and interpreting data has been increasingly adopted by SLA researchers since the 70s', and has established itself as an important research tool in the evolutionary context of SLA. This research tool will be described in detail in the next chapter, chapter 4, where subjects' production data of the present study is presented.

Implicational analysis, in Andersen's (1978: 223-234) words, "is a technique for correlating certain attributes of language use with individual speakers or groups of speakers of the particular language under study such that the presence of a particular attribute in the speech of the individuals being studied *implies* the presence of certain other attributes in their speech." Hence, consider, as an example, the four morphemes examined in the present study, lexical plural –s, phrasal plural –s, possessive –s and 3rd person-singular –s, where phrasal plural –s and possessive –s are grouped together since they are predicted by PT to emerge at the same stage. In table 3.6 below, subjects are grouped into four PT stages according to whether they met the acquisition criterion by supplying each of the four examined morphemes in at least two obligatory contexts. Number '1' refers to 'acquired' (attribute present), '0' 'not acquired' (attribute not present); and the number of subjects attained each stage is specified on the right hand side of the table.

Table 3.6: Example of Implicational table for the stages of lexical, phrasal, possessive and 3rd person-singular -s

Stage	Morphemes			Number of subjects at each stage
	Lexical Plural –s	**Phrasal Plural –s Possessive –s**	**3rd person-singular -s**	
5	1	1	1	5
3	1	1	0	13
2	1	0	0	5
1	0	0	0	13

Thus, in this table, the presence of the attribute 3rd person-singular –s in the speech of five subjects, represented by '1', implies the presence of three other attributes in their speech.

The 'quasi (seemingly) - implicational' scaling results from Johnston's (1997) study of the 21 English grammatical rules are listed in table 3.7. It is important to note here that these results were later compiled by Pienemann (1998: 178) to be based on 16 out of the total of 24 subjects who participated in Johnston's (1997) study; and it is not known why the other 8 subjects were not included in Pienemann's (1998) table. Accordingly, it was claimed by Pienemann (1998: 177) that the scalability of the table is "100%. This means that there is not a single piece of evidence to contradict the hypothesised implicational pattern, and this means that Johnston's study strongly supports the English processability hierarchy" as presented in chapter 2, section 2.2.3.2.

Table 3.7 Developmental Stages for English as a Second Language (Source: Johnston, 1997: 335)

Structure	Van	IS	Duc	My	JR	Hoa	ZJ	BB	JB	Minh	KS	KA	Dung	Vinh	ES	Long	Sang	Tam	KB	Canh	LJ	MM	AJ	Phuc
NO+X	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
SVO	?	?	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
"ING"	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
IRREG	0	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
PL "S"	-	+	+	?	+	?	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
ADVF	0	0	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
WH_+X	-	-	+	+	+	+	+	+	+	+	+	+	+	0	+	+	+	+	+	+	+	+	+	+
DON+V	?	-	?	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
NEG+V	-	-	-	-	-	-	-	+	=	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
RFX1	0	0	0	0	0	0	0	0	0	+	0	0	+	+	+	+	+	?	+	+	+	+	+	+
-ER	0	0	0	0	0	0	0	0	0	0	-	+	+	+	+	+	?	+	?	+	+	+	+	+
REG	-	-	-	-	-	-	-	-	+	+	?	?	-	+	+	-	?	?	+	+	+	+	+	+
PSINV	-	-	-	-	?	-	-	?	-	-	+	+	-	-	+	?	-	-	+	+	+	+	+	+
COMP	-	-	?	-	-	-	-	-	-	-	-	-	?	+	+	+	+	+	+	+	+	+	+	+
A-EN	0	0	0	0	0	0	0	?	0	0	?	?	+	?	+	-	?	+	+	+	+	+	+	+
D-FOR	0	0	0	?	?	?	0	0	0	0	0	0	+	+	+	+	+	+	+	+	+	+	+	+
D-TO	0	0	0	0	0	0	0	0	0	0	0	0	0	+	-	+	+	+	+	+	+	-	-	?
A-ING	0	0	0	0	0	0	0	0	?	0	0	0	?	-	-	+	+	-	-	+	?	+	+	+
3SG-S	0	0	0	0	0	0	0	0	0	0	0	0	0	+	+	+	0	+	0	+	+	+	+	+
AUX-2	0	0	-	-	-	-	-	-	-	-	-	?	-	+	-	+	-	-	+	-	-	-	+	+
ADV-LY	0	0	0	0	0	0	0	0	0	0	0	0	0	+	0	+	0	0	0	+	+	+	+	+

Convention: + indicates productive occurrences of the structure; - indicates no evidence of the structure; 0 indicates non-occurrence in obligatory contexts; ? indicates not enough evidence

Nonetheless, separately and in particular, the four grammatical structures examined in the present study received the following summary from Johnston (1997), "... it is possible that of the three –s morphemes, the third person singular is in fact a developmental feature [3], while the plural and genitive are not. ... In regard to nominal inflectional morphology, it is possible that the traditional morpheme order study order of difficulty or acquisition is erroneous, given that there exist substantial doubts about the developmental status of these markers. There is some evidence that regular plural marking may be a variational feature [4]. Due to lack of data the status of the genitive is unclear, but, equally, it may not be developmental in nature" (Johnston, 1997: 269). It is Johnston's (1997) above-formulated summary on the status of the English –s morphemes and lack of data that prompted me to conduct the present study.

Presented next in this section is the work of Jia (2003), which studies the acquisition of the English plural morpheme by native Mandarin Chinese-speaking children and adolescents.

3.4.2 Jia (2003)

The fact that the acquisition of the English plural morpheme by English-speaking children (L1 learners) and by children with specific language impairment had been extensively and systematically studied, and in contrast, research on the acquisition of the same morpheme by L2 learners was scattered and scarce, motivated Jia (2003) to conduct a longitudinal study on the acquisition of the morpheme by Mandarin Chinese-speaking children in the United States.

---

[3] [4] Following the Multidimensional Model from Meisel, Clahsen & Pienemann (1981) – chapter 2, page 17 of this thesis - developmental features are defined as linguistic features that mark developmental stages (e g. according to PT, the four –s morphemes examined in the present study occur in 3 stages), whereas variational features are those that occur across or within developmental stages (e.g. according to Johnston, the lexical and phrasal plural –s and the possessive –s all occur within a single stage of development).

The study aimed at answering the following three research questions, (i) what is the trajectory of L2 plural morpheme acquisition? (ii) what stages do L2 learners go through and what types of errors do they make? and (iii) what are the age and individual differences in plural morpheme acquisition? In addition, Jia (2003) claimed that answers to the above questions would help understand fundamental theoretical issues concerning (i) the similarities and differences in the L1 and L2 acquisition processes; and (ii) age differences in L2 acquisition.

Jia's (2003) participants were ten native Mandarin Chinese-speaking children and adolescents, five females and five males, aged from five to sixteen years old upon immigration to the New York City area. All participants attended public schools where all subjects were taught in English.

Sixteen data samples were collected by means of an elicitation task and spontaneous speech in each participant's home during their first five years of residence in the US, resulting in a total of 153 samples across all participants. The data collection sessions were conducted 7 times monthly during the first year, 4 times quarterly during the second year, 2 times half yearly during the third and fourth years, and 1 time in the last year. In addition to these samples, annual parental questionnaires (written in Chinese), child and parent interviews, and interviewer observations were also conducted.

Following Lahey, Liebergott, Chesnick, Menyuk and Adams (1992), Jia (2003) used the criterion of 80% correct use of the morpheme in obligatory contexts across three consecutive testing sessions to determine acquisition.

The results showed that (a) individual and age differences existed in the final attainment of plural mastery; (b) there was a tendency for older participants,

particularly those who did not master the plural morpheme, to perform better on the elicitation task than during spontaneous speech; (c) regular nouns constituted over 90% of the nouns produced by the participants, consistent with the distribution reported in the L1 literature; (d) required but omitted errors constituted the majority of errors, with the ratio over the total number of errors averaged over all rounds of measurements ranged from 84% to 97.2%; and (e) most participants showed an accelerated growth in the beginning of the study (linear) followed by a period of leveling off (non-linear), and during the early period of accelerated growth, participants differed in their speed of development. When growth approached asymptotic levels, the developmental functions all became horizontal and parallel. Finally, as participants' language environment became richer, their proficiency increased.

Finally, this chapter will look at Dyson's (2004) longitudinal study on the acquisition of the same English morphemes and grammatical rules, as those in Johnston's study, by learners of different L1 backgrounds.

3.4.3 Dyson (2004)

Working within the framework of PT, particularly with its variational dimension hypothesis, Dyson (2004) investigates the hypothesis on variational features proposed by PT. Variational features were part of the Multidimensional Model (MDM) established by Clahsen, Meisel and Pienemann (1983) who investigated inter-learner systematic variation. The focus of Dyson's (2004) study was to find learners' systematic variation within their developmental stages in acquiring ESL.

Dyson's (2004) subjects were six adolescents (three females and three males), aged between eleven and fourteen, newly arrived and learning ESL in Sydney, Australia. These learners were from three different L1 backgrounds: Arabic,

Bosnian German and a Mandarin-Shanghai dialect. Learners' spontaneous speech was collected in six sessions over a nine months period, through a mixed setting of naturalistic and instructed, and a series of communication tasks with the aim to elicit all of the grammatical structures in the PT's ESL stages (table 2.2, chapter 2).

Dyson (2004) followed and modified Pienemann's (1998) data interpretation approach in determining learners' language acquisition stage. The acquisition criterion was set at four or more productive tokens with at least four lexical and morphological contrasts, "where a lexical contrast means that the morpheme is found on two different words, eg 'trees' and 'dogs', in any sample and a morphological contrast means that the word with the morpheme eg 'dogs' also exists in a different form, eg 'dog' in the same sample." (Dyson (2004: 177)

The findings of Dyson's (2004: 18) study indicated that "these variational options and the earlier 'variational features' (Meisel et al., 1981; Clahsen et al., 1983) are not satisfactory in three respects. They are based on a theoretical construct which makes problematic assumptions about the learner's knowledge of the second language, they do not reliably predict variation and they exclude important aspects of variation."

To rectify the predictability of variation in PT, Dyson (2004: 18) proposed a new approach called "developmental style" which suggests that "learner orientation at each stage can be defined in terms of a learner's 'lexical' or 'grammatical' orientation." According to Dyson (2004), this orientation can be seen in a learner's tendency to use more or less often grammatical morphologies, such as the English plural –s or regular past –ed, in their speech production. A learner is called 'lexically-oriented' if he/she tends to use these grammatical morphologies less and resorts to syntax and lexical items more to convey his/her messages. A

'grammatically-oriented' learner, on the other hand, is more comfortable in using the grammatical morphologies. This found pattern of variation and development in her learners of ESL prompted Dyson (2004: 18) to the "developmental style" approach which would help explain how syntax and morphology develop independently. Accordingly, the first four ESL stages suggested by Pienemann (1998) in table 2.2, chapter 2, were reinterpreted by Dyson (forthcoming) as in table 3.8 below. It is important to appreciate that Dyson (2004) has gone beyond PT's predictions as she includes phrase structure rules in this table:

Table 3.8 The first four ESL stages for syntax and morphology (from Dyson, forthcoming)

Stage	Syntax	Morphology	Processing procedures	Main PS constituents Acquired	Grammatical features/ processes acquired
4	Yes/No questions	Have - has (Plural Concord) Possessive –s	Phrasal (Head-Complement/ Specifier – Head)	Auxiliaries in C	S-V agreement on main verbs (Det-N unification) NUMBER POSS
3	Topicalisation Adverb Fronting Do Fronting Wh- Fronting Neg+V Auxiliary + Verb Copula Questions (Stage 3)	Past -ed Past Irregular	Lexical (Head)	CP IP Auxiliaries in I	PERSON (Pro) GENDER (Pro) TENSE
2	SVO? SVO	(PL-s) Possessive pronoun Definite article V-ing	Lexical (Head)	DP Sentence NP, VP, AP, PP	ASPECT
1	Words and formulae		Words		

3.5 Conclusion

The above account of past studies on the acquisition of English morphology in second language learners has taken the reader through a time span of more than three decades to gain a picture of SLA research in this particular area. The account covers most of the cross-sectional and longitudinal studies from the 1970s until the present days, and serves the purpose of bringing together all of the discussion in the area, identifying the gap especially between past studies and the present study, and positioning the present study within the context of SLA research.

The morpheme order studies in the 70s' and 80s', both cross-sectional and longitudinal, provided valuable results in various ways such as extending UG to the field of SLA (in the work of Brown, 1973; Dulay and Burt, 1973, 1974a, 1975) and supporting the theoretical development of Krashen's (1977, 1978, 1980) Monitor Model, and the Acculturation hypothesis proposed by Schumann (1978a, 1978b, 1978c) (see sections 2.2.2.2 and 2.2.2.3, chapter 2, in this thesis).

Despite all these useful results, the methodology that these researchers used in their studies to elicit and analyse the data has received severe criticism (reviewed in Gass and Selinker, 1994). Firstly, the elicitation technique, the BSM, was said to bias the results. When Porter (1977) administered the technique to a group of native English children, he found that their acquisition order was more similar to that of L2 learners than to Brown's (1973) experiment on native English children. Secondly, the equation of acquisition to relative accuracy in production was said to be unjustified in these studies as longitudinal studies on morpheme orders rendered results that were different from those obtained in the cross-sectional studies by such researchers as Dulay and Burt (1973, 1974a, 1975), Bailey, Madden and Krashen (1974), etc. To help clarify these points, Andersen (1978), in his study of the use of thirteen English grammatical morphemes by 89 Spanish-speaking

learners, proposed a model for dealing with individuals as well as groups, variability as well as systematicity in L2 research. The model comprised a revised version of the Ordering-theoretic Method from Bart and Frus (1973), Dulay and Burt (1974b) and implicational analysis from DeCamp (1973).

The results of Andersen's (1978: 221) study support Krashen's (1977) 'Natural Order' for the acquisition of grammatical morphemes, Larsen-Freeman's (1976) work on frequency as an explanation for morpheme orders, and Rosansky's (1976) criticism of cross-sectional methodology for failing to deal with individual variation in the data, but reject Rosansky's claim that her cross-sectional analysis of her data does not agree with the longitudinal analysis of one of her subjects and thus invalidates her strongest argument against cross-sectional methodology. In relation to the present thesis, while those studies of the 70s' did provide certain acquisitional order of the formative –s, no information about learners' processes and constraints in acquiring the feature was mentioned. Similarly with those studies in the 80s', however, Pica's (1983) study did shed some light on the possible influence of instruction on learners' performance of some English grammatical morphemes.

The studies of ESL learners in the 90s' and beyond, especially those by Johnston (1997) and Dyson (2004) within the framework of PT, have not only paved the way for the present thesis but also enriched/expanded the theory. However, there is a need to revise the so-called 'quasi-implicational' methodology used by Johnston (1997) and the criteria for determining his participants' acquisition of the structures studied. Despite all that, Johnston's (1997) inconclusive results on the English formative -s and in particular, his remark that Vietnamese learners' "phonological problems with final stops and consonant clusters complicate the issue to such a degree that there must be some doubt about the value of discussing plural –s for

these speakers in either variational or developmental terms" (Johnston, 1997: 263), have sparked my interest in studying further the feature and its acquisition process by Vietnamese learners of EFL. This interest has also been all the more justified by the studies of Jia (2003) and Dyson (2004), which, respectively, brought about L1 Chinese learners' acquisitional path of the English plural morpheme and various L1 learners' 'developmental style' in relation to English syntax and morphology.

Within this context, and in addition to Johnston's (1997) research, the present thesis will explore whether or not the English verbal marker –s is developmental and whether or not the English nominal plural marker –s is variational. It will also seek to shed light on any linguistic and/or processing constraints that Vietnamese learners of EFL might have experienced in their way to acquiring the English formative –s. Unlike all of the studies accounted above, the present thesis undertakes two studies, one on the learners' spontaneous speech production and the other on their reaction times in sentence matching tasks, the latter is a supplement to the former. The first study, the study on learners' spontaneous production speech, will be presented next, in chapter 4.

"The most difficult step in the study of language is the first step."

Bloomfield (1933: 21)

CHAPTER 4
PRODUCTION STUDY

4.1 Chapter Overview

This chapter describes my study of the acquisition of the English formative -s from the oral production data of thirty-six Vietnamese learners of English as a foreign language (EFL) within the framework of Processability Theory (PT). The chapter begins with statements of the study's aims, objectives and research question. Methodological issues are presented next, including the study type, a historical overview of tasks, data organisation and data analysis methods. A discussion of the results of the study in section 4.6 concludes the chapter.

4.2 Aims, Objectives and Research Question

The aim of this study is to test the Procedural Skills Hypothesis laid out by PT. According to this hypothesis, "the task of acquiring a second language is based on the acquisition of the procedural skills needed for the processing of the language," (Pienemann, 1998: 215). The procedural skills under investigation in this study are those that are needed to acquire, among other structures, the English formative -s which can function morphologically as a lexical plural marker, a phrasal plural marker, a possessive marker or an inter-phrasal third-person-singular verb marker. As presented in detail in chapter 2, section 2.3.3.2, PT predicts that these linguistic markers should emerge in learners' speech in sequential hierarchical stages: the lexical plural marker at stage 2, the phrasal plural and the possessive markers at stage 3, and the inter-phrasal 3rd-person-singular verbal marker at stage 5. In other words, these nominal and verbal –s morphemes are predicted by PT to be acquired in the following sequence:

lexical < phrasal < inter-phrasal

(phrasal plural and possessive –s)

To determine if this prediction holds for EFL, this study aims at answering the following question,

> In formal Vietnamese adolescent learners (aged 13 to 18), is the task of acquiring the English verbal and nominal morphemes -s in an instructed and foreign setting based on the acquisition of the procedural skills needed for the processing of the language?

The specific null hypotheses to be tested in this study on Vietnamese learners of EFL are,

1. The verbal inter-phrasal 3rd-person-singular morpheme -s does not require prior acquisition of the three nominal morphemes –s, namely the lexical plural -s, the phrasal plural -s and the possessive –s; and

2. Acquisition of the three nominal morphemes –s do not follow PT's suggested developmental sequence of lexical - phrasal - inter-phrasal.

The results of this study will help determine possible important implications for the development of a suitable syllabus for teaching, at least in the context of instructed Vietnamese learners of EFL.

The next section addresses the methodology of the present study.

4.3 Methodology

This section starts with the rationale for choosing a cross-sectional architecture as the foundation of the study, followed by a review of tasks - an effective data

collection instrument which the study takes on in designing and planning its materials - and their role in SLA research. This review leads to the rationale for using tasks in the study. The section continues with the description of the study's subjects and its sample size. The data collection procedures are documented next, followed by the description of how the data is organized and interpreted prior to its analysis and results.

4.3.1 Study type: Longitudinal versus Cross-sectional

The database of this study was built on a cross-sectional approach. The cross-sectional, rather than the longitudinal, approach was favoured for the following reasons:

1. Although a longitudinal study is more desirable in that "certain structural properties of the learner's performance can only be explained if one also knows preceding and following developments" (Meisel et al., 1981: 114), the size of the task which requires data to be collected at regular intervals was out of reach of the present study. In practical terms, the recurrent nature of longitudinal studies makes it difficult for the researcher to maintain contacts and to travel back and forth between Vietnam and Australia. This difficulty is associated with the next one.

2. Although Vietnamese learners were always enthusiastic and cooperative in the project, which is a bonus for a researcher, to finally have access to them was not easy. The political and security barriers imposed on 'foreigners' by the national and local Vietnamese governments were another deterring factor for considering a longitudinal study or even for getting more subjects for the study.

3. Finally, with its informational objectives in mind, the purpose of the study was to achieve as high as possible a level of generality without being restricted to the detailed study of one individual learner's interlanguage. This consideration was in fact an important factor in determining a *manageable* sample size for the project.

Accordingly, the decision was made for a cross-sectional design of the study. This decision was also driven by the assumption that, by applying the methodology of implicational scaling and with a selection of a wide range of subjects at various developmental stages in their process of learning the language, a larger developmental map to that of a longitudinal study of a single participant could be reached. However, verification of the cross-sectional results by a longitudinal study is still needed, and will require further study at some point in the future.

Once the cross-sectional design for the study had been decided, the next methodological issue was to determine by which means subjects' data was going to be collected. The cross-sectional design of the study allows for a reasonably large sample of subjects as well as data. For this reason, elicitation tasks were the most preferred choice. The rationale for using elicitation tasks has been justified from the abundance of literature on tasks in teaching and in SLA. The following section provides a review of that literature.

4.3.2 Data Collection Instrument: Tasks and Why Tasks?

As tasks entered the teaching contexts before being applied to SLA, the next section outlines, in a historical context, the emergence of tasks in the language classrooms.

4.3.2.1 The Evolution of Task-Based Instructions in Language Classrooms

The end of the Second World War saw the need to expand communications beyond national boundaries, and the necessity to learn and teach languages during this time led to the Audiolingual Methodology (ALM) [5], an approach that dominated language classrooms well into the 1970s. The year of 1972 witnessed the transition from the ALM to the Communicative Language Teaching (CLT) Methodology [6] following the research findings from Savignon (1972). With the introduction of Communicative Language Teaching (CLT) methodology by Savignon in 1972, along with other constructs such as role play, process writing and interactive reading, tasks became recognised as an indispensable component in language teaching and learning (Crookes and Gass, 1993; Skehan, 1998; Bygate et al., 2001; Ellis, 2004).

The next sections will look at how tasks have been positioned over time in SLA research by first examining some definitions of 'task', then the role of tasks.

---

[5] For more historical background and examples of teaching materials of ALM, see Richards and Rogers (1986).

[6] See Savignon's (1983) chapters 1 and 2 for this sense of evolution.

4.3.2.2 What Is a 'Task'?

There has been no single agreed definition of tasks. Different authors, researchers and educators take different perspectives and have different views about tasks.

Long (1985: 89) provided a broad definition of tasks: "A piece of work undertaken for oneself or for others, freely or for some reward. Thus, examples of tasks include painting a fence, dressing a child, filling out a form, ... In other words, by 'task' is meant the hundred and one things people *do* in everyday life, at work, at play, and in between."

Crookes (1986), Wright (1987) and Ur (1996) looked at the goal of tasks in language teaching and defined tasks as from the task-designer's viewpoint. According to these authors, tasks are designed to ask learners (and teachers) to perform certain operations specified in input data. Therefore, tasks are essentially goal-oriented and require students to work in group, or pair, in order to achieve an objective that is usually expressed by a task specification.

Other authors, such as Prabhu (1987), Nunan (1989), Lee (2000) and Ellis (2004), defined tasks from a meaning-focused perspective. These authors perceived tasks as classroom activities that involve and require learners to attain certain objectives through some process of thinking, understanding, manipulating, interacting and finally producing in the target language "while their attention is principally focused on meaning," (Nunan,1989: 10). These authors also stressed the role of the teachers in controlling and regulating that process.

However variable these definitions of task are, most authors, except Long (1985), all share the core view that tasks are designed to engage learners in using the target language to achieve certain non-linguistic goals. The designing step for tasks

is therefore of crucial importance in both teaching and research. To assist researchers and teachers in this step, Ellis (2004: 20-21) outlined the task framework, figure 4.1 below, which (1) "allows for the systematic description of different tasks", (2) "provides a basis for identifying the various options for designing tasks", and (3) "can assist in the identification of different task types and their classification." As such, this framework was followed closely in the designing step for the tasks used in eliciting data for the present study.

The next section will look at the role of tasks in Second Language Acquisition (SLA) research.

Figure 4.1: A framework for describing a specific task (from Ellis, 2004: 21)

Design feature	Description
1 Goal	The general purpose of the task, e.g to practise the ability to describe objects concisely; to provide an opportunity for the use of relative clauses.
2 Input	The verbal or non-verbal information supplied by the task, e.g. pictures; a map; written text.
3 Conditions	The way in which the information is presented, e.g. split vs. shared information, or the way in which it is to be used, e.g. converging vs. diverging.
4 Procedures	The methodological procedures to be allowed in performing the task, e.g. group vs. pair work; planning time vs. no planning time.
5 Predicted outcomes:	
Product	The 'product' that results from completing the task, e.g. a completed table; a route drawn in on a map; a list of differences between two pictures. The predicted product can be 'open', i.e. allow for several possibilities, or 'closed', i.e. allow for only one 'correct' solution.
Process	The linguistic and cognitive processes the task is hypothesised to generate.

4.3.2.3 Tasks in Second Language Acquisition (SLA) research

Studies in SLA have been mainly descriptive at the beginning, such as in Dulay and Burt (1973, 1974a, 1975), Hakuta (1976), and Hatch (1978), where the process of how either child or adult learners acquired a second language was described, to more theory-based nowadays.

Even in the early days of SLA descriptive research, tasks were utilised to provide samples of specific linguistic features that researchers wanted to study but were difficult to find in naturalistic speech data. This resulted in the differentiation of data types and elicitation techniques to suit certain research purposes. Hyltenstam (1983: 58) distinguished two types of data, "*observational data,* i.e. data obtained from more or less spontaneous speech and writing", and the "various more technically elicited data types", that "have sometimes been gathered together under the label of *experimental data.*"

Experimental data can be collected via various instruments or techniques. Ellis (2004: 22) differentiates two distinct types of instruments, "clinical elicitation" where general language data is collected, and "experimental elicitation" where samples of language containing specific linguistic features are needed.

Among the experimental elicitation techniques is the well-known Bilingual Syntax Measure (BSM) by Dulay and Burt (1973), which was a series of communicative tasks used to elicit morphological features such as the plural-s and the regular past tense –ed from learners through pictures stimuli and questions about them. Other commonly used techniques include guided composition, sentence imitation and completion, cloze procedure, dictation, translation and grammaticality judgement tests.

It has also been a common practice among researchers to use a combination of these techniques or a combination of observational data and experimental data in one study. Examples of such studies are by Swain, Naiman and Dumas (1978), and by Schmidt (1980). In their study, Swain et al. (1978) used three techniques to record the order whereby a group of five-years-old English-speaking children acquired some grammatical rules of French. The three techniques they used were the Berko test (Berko, 1958), imitation and translation. The Berko test is of the format, '*This is a wug, here we have two ...* ', where learners have to fill in the gap to complete the sentence. Results showed that, these English-speaking children achieved an increased level of acquisition of the French morphological features under study, depending on the test type. That is, the children obtained the lowest scores in the Berko test, but were better in the imitation task, and scored highest in the translation task.

While the above-mentioned studies utilised tasks to examine learners' output, other SLA researchers used tasks to investigate the effects of input on learners, following Krashen's (1981, 1985) Input Hypothesis and Long's (1980, 1981) Interaction Hypothesis. These hypothesis-based studies were aimed at finding out which kind of input most benefited learners, whether it was for comprehension as studied by Pica, Young and Doughty (1987), or for production as studied by Doughty (1991). Following Long's (1996) refined version of the Interaction Hypothesis, which emphasised meaning negotiation methodology, other researchers, such as Mackey, Gass and McDonough (2000) and Ayoun (2001), utilised tasks in their studies to focus on the effects of feedback on learners' acquisition of the target language.

An interesting combined support for the Input Hypothesis (Krashen, 1981, 1985), Output Hypothesis (Swain, 1985) and Interaction Hypothesis (Long, 1980, 1996)

was empirically established in Mackey's (1995) task-based research. In her research, Mackey (1995) studied three groups of seven learners, two of these three groups were experimental groups and the third one was the control group. These learners were of beginning and lower-intermediate ESL levels. The materials were twelve task-based activities where the targeted linguistic item was question formation, and which learners had to complete with native speakers in a time span of one week. The first experimental group participated in the interaction, the second experimental group observed the interaction, and the control group did not involve in either of the two activities. Mackey's research question was how many of these learners would move to the next stage of acquisition. The results showed that five of the seven learners who interacted moved to the next stage of acquisition, four of the seven who observed move to the next stage, and only one of the seven in the control group moved to the next stage. Mackey's findings showed the benefits of tasks on SLA and therefore, in language teaching.

Apart from the Input and Interaction Hypotheses, task-based research was also drawn on by other theories of language learning. The Vygotskian theory (see Chapter 2, section 2.2.3.1), for example, where all learning was viewed as socially motivated, has led to various task-based studies that investigated the concepts of 'scaffolding' and 'collaborative dialogue' among learners (Donato, 1994), or how learners interpreted assigned-tasks in their actual performance (Coughlan and Duff, 1994).

Levelt's (1989) model of speech production, which was presented in details in chapter 2, section 2.3.3.2, has also motivated some researchers (Bygate, 1996; Wendel, 1997) to get an insight into the planning process that learners might adopt before and at the time they engaged in performing assigned tasks.

Besides task-based studies that were driven by theories as reviewed above, tasks themselves have also been a subject of research in their own right. In the 1980s and early 1990s, influenced by the Input and Interaction Hypotheses, some researchers embarked on studying tasks with the aim to find out which task characteristics, as specified by Crookes (1986: 21), "can be shown to affect the nature of language produced in performing a task in ways which are relevant to second language processing and second language learning". Examples of studies along this line are those that were conducted by Pica and Doughty (1985), Duff (1986), Yule and McDonald (1990), and Pica et al. (1991).

More recent studies have examined tasks that could at the same time facilitate both form-focus and meaning-focus in learners when they performed the tasks. These studies have been influenced by findings from SLA research and by theory that by drawing learners' attention wholly on meaning through content-based instruction methodology, both teachers and learners have sacrificed another important aspect of language learning, i.e. the acquisition of grammatical competence (Swain, 1985; Long, 1991; Doughty and Williams, 1998).

The above review of the role of tasks in language teaching and in research over the last three decades demonstrates that tasks have established themselves as a dynamic and valuable teaching and research tool, and also as a subject of research in their own right. The review, however, addresses the essential questions of *why* tasks rather than the "synthetic methods" (Long and Robinson, 1999: 16) such as Audio-Lingual Method, Audio-Visual Method or Total Physical Response in language teaching, and *why* tasks rather than (unstructured) interviews or conversations were preferred in many SLA studies.

In particular relation to the present study, tasks prove themselves as superior to relying on naturalistic data. Despite the much less elicitation time spent with each subject (approximately 30 minutes) than that in Johnston's (1997) study, the present study managed to produce dense and more robust data with regards to the structures investigated by both studies. This is all the more important considering Johnston's conclusion that due to his lack of sufficient data, he was unable to settle the important question of whether or not the acquisition of nominal morphology is variational or developmental.

Once the design phase of the present study had been decided, the next step was to implement this design. In this implementation stage, the materials, subjects, sample size and data collection procedures were carefully considered. These processes are described next.

4.3.3 Materials

The study used a series of elicitation tasks for subjects to engage in and actively produce the structures under investigation. These tasks were designed following Ellis's (2004) framework described in figure 4.1 above:

Design feature	Description
1 Goal	To elicit the English lexical plural –s, phrasal plural –s, possessive –s and 3rd person-singular –s.
2 Input	Pictures and verbal questions.
3 Conditions	Information is presented separately for each feature, i.e. separately for lexical, phrasal, etc.; however converging is the way in which the information is presented.
4 Procedures	One learner at a time performs the task with the researcher in planned time.
5 Predicted outcomes:	
Product	A list of instances of regular nouns (singular and plural), proper nouns with possessive marker and 3rd person-singular regular verbs produced by each learner in a flowing conversation format. These predicted outcomes are 'closed', i.e. allow for only one 'correct' solution.
Process	The tasks are to generate evidence of linguistic and cognitive processes whereby learners are considered as acquiring or non-acquiring the feature/s.

Accordingly, a series of three tasks were developed specifically for the purpose of the study. Each task follows a theme that subjects are familiar with such as schools,

classrooms, friends, play and family. Each task has 4 theme-related sub-tasks corresponding to the four structures to be tested: the first sub-task aimed at eliciting the lexical plural-s, the second the phrasal plural-s, the third the possessive-s, and the fourth the 3rd-person-singular-s. Input for the first 3 sub-tasks in each task were mainly pictures, and the fourth sub-task was a guided conversation on the theme of the task.

In wanting to collect data from subjects of all levels, I had to consider the fact that beginning learners had only a very small vocabulary. Consequently, the vocabulary to be used was based on the glossary of Year 6 textbook to make sure the earliest informants (year 7 subjects) all had had access to each vocabulary item. This was verified through a vocabulary test (Appendix B) preceding the actual data elicitation.

To ensure the effectiveness of the tasks in eliciting the tested structures, all tasks were trialled in the pilot test (details in section 4.3.6 in this chapter) with twelve ESL learners, six females and six males, of the same age groups, thirteen to eighteen, at the Secondary Introductory English Centre in Dickson, Canberra. The three task series have the following themes:

a. Task series 1: Schools and Friends.
b. Task series 2: Games and Family.
c. Task series 3: Farms and Farmers.

A detailed description of all the tasks is in Appendix C.

4.3.4 Subjects: As the purpose of this study is to establish possible important implications for the development of a suitable syllabus in teaching and learning

ESL, especially in Vietnamese schools (see research background in Chapter 1, section 1.1), it is ideal to have participants who are functioning in that environment and directly involved in the language learning process. The natural choice, therefore, was for schools and subjects to be Vietnamese.

The chosen place was Ho Chi Minh City, a busy 'hub' of Vietnam, where foreign contacts are always at their highest, and similarly, with foreign language learning and teaching.

Geographical criteria played an important part in my decision of which school to select in the study. Three areas were chosen to represent the whole city: a central district, an outskirts district, and a district in between these two. Each district had two schools involved in the study, one secondary school (year six to year nine) and one high school (years ten to twelve). Due to political and security issues in Vietnam, the local authority only allowed me, as a 'foreigner', limited access to certain schools in the city. I had to depend on my acquaintances to gain access to other schools and subjects; therefore the choice of particular schools was in fact by chance.

Considering the fact that year six is the official entry level to learning English, it was acknowledged that year six subjects might not have enough 'repertoire' of the language to provide sufficient data for the study. As a result, selected subjects ranged from year seven to year twelve. And in each grade at each school, there was one *male* and one *female* student asked to voluntarily participate in the study. The two main criteria for choosing subjects were that they had started learning English at the beginning of secondary school, which is year six, and that ideally, they did not attend other private English learning centres.

At each school, I first talked to the Principal about my project, its objectives and procedures, and then asked to have two students from each grade, one female and one male, that met the above two selection criteria to participate in the study. The request was passed onto the teacher-in-charge of the English department at the school, who went to each grade and asked for volunteer students. As such, subjects were not paid to participate in the study. These students would then answer a small background questionnaire (Appendix A) to make sure they met the criteria. This procedure was repeated at all six schools involved.

4.3.5 Sample Size

The final number of volunteered subjects, which was thirty-six, reflected the exhaustive list of grades and participating schools [(2 students each grade x 3 grades each school x 3 secondary schools) + (2 students each grade x 3 grades each school x 3 high schools) = 36]. If, according to Johnston (1997: 112), in ESL research, his cross-sectional study with twenty-four informants was "the biggest of its kind", then thirty-six subjects would be a manageable sample size for the present study. It is also worth mentioning here that while the ZISA project (Meisel, 1980; Meisel et al., 1981) had more subjects (45 in total), it had many more resources (3 principle researchers).

The next issue to be documented in the design implementation step is the procedures used in collecting data.

4.3.6 Procedures

A pilot test was carried out with twelve ESL learners, six females and six males, of the same age groups, thirteen to eighteen, at the Secondary Introductory English Centre in Dickson, Canberra. These learners were from different linguistic backgrounds, with only one from Vietnam. The purpose of this pilot test was to

make sure the setup procedures and tasks would run smoothly and more importantly, to make sure the needed data would be collected. The positive results and feedback obtained from this test run facilitated the main experiment with formal Vietnamese learners in Ho Chi Minh City. The procedures conducted in this pilot test were closely followed in the main data collection in Vietnam.

A vocabulary test sheet, listed in Appendix B, was given to subjects via their coordinating teacher at least one day before the test day. Subjects were asked to study all the vocabulary before coming to the test, and to make sure all the words were fully understood.

On the test day, which took place in one of the vacant rooms at the school where the subjects studied, I worked with one subject at a time for one hour each. This time frame included five minutes for administrative purposes, five minutes for practising the on-line experiment, four five-minute reaction time (RT) experiment sessions (see chapter 5), and the three elicitation task series for spontaneous oral production in between the four on-line sessions. Figure 4.2 below outlines the timeframe of the whole data collection procedure.

Figure 4.2: Timeframe for Data collection Procedures

Admin	Practice	RTSession1	***OralTask1***	RTSession2	***OralTask2***	RTSession3	***OralTask3***	RTSession4
5mins	5mins	5mins	***10mins***	5mins	***10mins***	5mins	***10mins***	5mins

Total: 60 minutes

Each task series would take about ten minutes, therefore a total of about thirty minutes altogether for each subject for the whole data elicitation procedure. At the start of each task series, there was a small warm-up theme-related conversation then the subject was led to sub-task1, followed by sub-tasks 2, 3 and 4; each sub-

task would last between 2 and 2 ½ minutes. Examples of subjects' speech production are in Appendix D.

4.3.7 Data Organisation

4.3.7.1 Data Storage and File Naming Convention

Subjects' production data from the three oral tasks were recorded digitally and stored on the computer. Each oral task series occupied a file; therefore each subject had three oral files kept on the computer, indicated by subject's initials followed by cardinal numbers 1, 2, and 3, for example "VA1", "VA2", "VA3". The recording software also recorded the time, date and length of each task performance on the files. The total time of all subjects' speech production recorded in this data collection was 19 hours, 39 minutes and 49 seconds.

4.3.7.2 Data Selection

Subjects' speech data were transcribed, and the transcripts were repeatedly checked for accuracy and consistency. To determine the amount of subjects' production of obligatory contexts, tokens and types, the following coding decisions were made:

(i) In general,

. not to be included in the analysis are words repeated after the researcher (which were very rare);

. immediate and identical repeated phrases are excluded so that only the first instance was counted as one obligatory context; for example, in utterances such as " .. she teach .. she teach at this school...", only one type and one token of *'teach'* is counted towards subject's production record. This

decision was made in order to be consistent with the decision discussed next.

. with repeated phrases where subjects self-corrected, for example, "... teacher, the teacher's", whether or not subjects supplied the rule, the first utterance is counted towards an obligatory context. This decision was made on the ground that this study's theoretical framework is Processability Theory which stresses L2 learners' underlying processing operations. Therefore, subjects' self-correction which could reflect their performance monitoring is excluded from the analysis.

(ii) With the lexical plural –s and phrasal plural -s, not to be included in the analysis are

. the words 'pupils' and 'peoples', because of the undistinguishable pronunciation between these two words produced by the subjects.

. the word 'buffalo', because it has two forms of plural, 'buffalo' and 'buffaloes', it was therefore not possible to judge if subjects did process the plural meaning and the form '-s'.

(iii) With the possessive-s, not to be included in the analysis are

. names ending with '-s' or 's' sound, eg. Ross and Alice, as it was not clear whether possessive-s was actually applied.

(iv) With the 3rd-person-singular-s, not to be included in the analysis are

. the 3rd-person-singular forms of the verbs BE, HAVE, DO and GO as these verbs are irregular verbs. Another reason for excluding these forms of verbs was that they can be involved in formulaic expressions.

(v) Finally, data from the warm-up sessions was also transcribed and included in the analysis as most questions and answers were relevant to the topics of the conversation and therefore demonstrated subjects' linguistic procedural skills.

4.3.7.3 Types versus Tokens

After valid data items were filtered in, a quantitative analysis was carried out on both types and tokens as suggested by Pallotti (2004). Types were taken into account in order to avoid possible skewed results due to over-use of certain (possibly formulaic) items if analysis was based on tokens only. And tokens were also considered in order to avoid a possible partial view of overall production if analysis was based on types only. In all, analysis was based on a dataset which comprises:

. 2179 *contexts* including 487 for the lexical plural -s, 778 for the phrasal plural -s, 557 for the possessive –s, and 357 for the 3rd-person-singular –s;

. 910 *tokens* including those of 172 of the lexical plural –s, 390 of the phrasal plural –s, 303 of the possessive –s and 45 of the 3rd-person-singular-s.

It is important to appreciate that many more contexts than tokens were produced because the 'empty' contexts represent non-production, which are taken as evidence for non-acquisition. The data therefore is regarded as robust, both with respect to acquisition as well as non-acquisition.

4.3.8 Data Interpretation

All valid data types and tokens from subjects' interlanguage corpus then underwent the following three stages of interpretation: (1) a quantitative distributional analysis, (2) application of an emergence criterion for acquisition (a

qualitative interpretation) to the quantitative distributional analysis, and (3) application of implicational scaling to the qualitative interpretation based on the emergence criterion for acquisition. The three interpretation stages are described next.

4.3.8.1 Distributional Analysis

To capture the dynamics of subjects' interlanguage development, and to lay out evidence for the later application of an emergence criterion for acquisition or a qualitative data interpretation, a "finely-grained distributional analysis" (Pienemann, 1998: 139) is needed. In a distributional analysis, all linguistic contexts such as rule suppliance, non-suppliance, over-suppliance or alternative strategies, are covered. For each individual subject, the number of linguistic contexts for each test structure was calculated, then both types and tokens were accounted for

(i) Evidence for rule application;
(ii) Evidence for non-rule application; and
(iii) Evidence for other strategies, such as overgeneralisation and suppliance of contrasted forms, which can be used towards determining acquisition.

An example of such tables is shown in Appendix E.

4.3.8.2 Acquisition Criteria versus Emergence Criteria for Acquisition

To particularly work within a theoretical framework like PT that views "language acquisition as a process of development which evolves in stages/sequences brings with it a need for criteria to determine when a feature or stage is considered as acquired" (Jansen, 2002: 45). Although this methodological issue has been raised

for decades, starting with Brown's (1973) study of first language acquisition (FLA) [7], and despite the call for its definition and recognition as a complex and fundamentally important research tool (Jansen, 2000: 33f; Pallotti (2004)), acquisition criteria still remain arbitrary.

Within the ever-growing community of researchers working within the framework of PT, various acquisition criteria have been applied in their studies, such as those of Håkansson et al. (2001), Zhang (2002), Mansouri (2002), Dyson (2004). This arbitrariness of the acquisition criterion, according to Pienemann (1998: 138), not only does not make it possible to predict how suppliance in obligatory contexts will develop in any given structure and learner, but may also produce arbitrary orders of accuracy, and acquisition.

To avoid these problems, Pienemann (1998: 138) proposes "the point of *emergence*" which will remain "constant" and "relevant" from both a processing and a descriptive viewpoint. "From a speech processing point of view, emergence can be understood as the point in time at which certain skills have, in principle, been attained or at which certain operations can, in principle, be carried out. From a descriptive viewpoint one can say that this is the beginning of an acquisition process, and focusing on the start of this process will allow the researcher to reveal more about the rest of the process" (Pienemann, 1998: 138). Emergence of the structure is the evidence that the processing prerequisite for producing it have been acquired. In addition, the emergence criterion for acquisition "is ideally suited for a theory [PT] which is directed mainly at capturing the systematicity of spontaneous oral production." (Pienemann, 1998: 148).

---

[7] See chapter 3 on the Morpheme Order studies

According to Pienemann (1998: 144), the emergence criterion for acquisition can be applied to both "syntactic and morphological interlanguage development"; and a successful application of the emergence criterion for acquisition to the latter (i.e. morphology) has to take into consideration subjects' production of at least two lexical and two morphological variations in a sufficient number of contexts (e.g four (Pienemann, 1998: 145), to avoid possible unanalysed, memorised blocks (Pienemann, 1998: 147).

As the aim of the present study is to test PT's proposed acquisitional stages of the English morphemes –s by Vietnamese learners of EFL, it is important that the present study applies the emergence criterion for acquisition as set out above by Pienemann (1998). However, taking into account the robustness and representativeness of the data collected, the present study can afford a higher number of contexts: learners are considered to have acquired the processing prerequisites for any of the tested features in the present study, if they actively produce the feature with:

(a) ***Lexical variation***: at least one token each of two types, e.g. *two books, three cats, he rides, he works …*

(b) ***Morphological variation***: at least one contrasting singular form in the case of phrasal plural –s (e.g. *one book*), or one contrasting singular/plural form in the case of the 3rd-person-singular –s (e.g. *I/They ride*); and

(c) in at least ***five linguistic contexts.***

The next section describes another data interpretation tool which the present study uses, that of Implicational Analysis.

4.3.8.3 Implicational Analysis and Guttman Procedure

As mentioned briefly in chapter 3, section 3.4.1, "implicational analysis is a technique for correlating certain attributes of language use with individual speakers or groups of speakers of the particular language under study such that the presence of a particular attribute in the speech of the individuals being studied *implies* the presence of certain other attributes in their speech" (Andersen, 1978: 223-224).

Following Guttman's (1944) implicational scaling or scalogram analysis (also known as Guttman procedure), DeCamp (1971) was the first to apply this analysis tool to linguistic data before Andersen (1978) proposed an Implicational model for second language research. This model "consists of a revised version of the Ordering-Theoretic Method (Bart and Krus 1973; Dulay and Burt 1974b) in conjunction with implicational analysis as used in sociolinguistics" and offers help in "dealing with individuals as well as groups, variability as well as systematicity in L2 research" (Andersen, 1978: 221). Using his proposed model, Andersen (1978) analysed his own study's cross-sectional data on ESL, and evaluated the findings of the previous morpheme order studies, including those of Larsen-Freeman (1976), Rosansky (1976) and Krashen (1977b). Like DeCamp (1971), Andersen's (1978) analysis concluded after the calculation of the coefficient of reproducibility, which is only the first step of the four in Guttman procedure. This coefficient has been accepted as significant at .90 or 90%.

Many SLA researchers in the 1980s and early 1990s followed DeCamp's (1971) implicational analysis method in the analysis of their data until Hatch and Lazaraton (1991) revived Guttman's four-step procedure and introduced it into the field of applied linguistics. These four steps, according to Hatch and Lazaraton (1991: 210-212), are for calculating,

(a) the Coefficient of Reproducibility which "tells us how easily we can predict a S[subject]'s performance from that person's position or rank in the matrix",

(b) the Minimum Marginal Reproducibility which "tells us how well we could predict if we did not consider the errors (the places where people behave in ways not predicted by the model)",

(c) the Percent Improvement in Reproducibility which "shows how much improvement there is between the coefficient of reproducibility and the minimum marginal reproducibility", and

(d) the Coefficient of Scalability which "indicates whether a given set of features are truly scalable (and unidimensional)."

The results obtained from these steps would "give extra weight to the evidence" (Hatch and Lazaraton, 1991: 210) shown by the data. However, even in recent years, not all of these four steps have been taken up by many SLA researchers.

Within the theoretical framework of PT, implicational analysis is particularly useful in describing or representing the dynamic aspects of the interlanguage. As indicated by Pienemann (1998: 135), "When it comes to accounting for cross-sectional data, implicational scaling has a further advantage." The advantage is that "interlanguage samples from different speakers can be represented on what is the time axis ..." in longitudinal studies, and that "if such an exercise produces a valid implicational relationship of individual interlanguage rules, then the chronological development of these rules can be hypothesised to follow the implicational pattern" (Pienemann, 1998: 135).

Following Hatch and Lazaraton (1991) and Pienemann (1998, quoted above), the cross-sectional data of the present study are first arranged into matrix tables where the tested structures occupy the columns (the longitudinal *time* axis) and the subjects the rows (the longitudinal *rules* axis). Guttman's four-step procedure is then applied to determine the scalability of each table. Also following Hatch and Lazaraton (1991), to claim the scalability of each table, this study adopts two criteria, the coefficient of reproducibility, calculated in step 1, has to be higher than .90 (90%) **and** the coefficient of scalability, calculated in the last step, has to be higher than .60 (60%). If for a certain set of data, the coefficient of scalability is in the .60 range, but its coefficient of reproducibility is below .90, then that set of data can not be claimed as scalable.

4.4 Results

Appendix F provides an overview of the distributional analysis of the data. It shows the raw data figures of types and tokens, lexical variations (before the /), contexts (after the /), and contrasting forms (morphological variation) supplied by each subject for the four tested features. The table also lists other contexts ('Others') that subjects produced.

The analysis also noted instances of over-generalisation to singular contexts (e.g. *a dogs*) in the phrasal plural –s category. The total number of these instances as well as that provided by each subject is insignificant: 9 out of 36 subjects, each of whom produced one instance of this form while correctly supplying all other contrasting pairs such as *three boards/one board, two cats/one cat.* As a result, these instances are not interpreted as those of over-generalisations, but rather as those of 'slip of the tongue' for they are not indicative of an underlying over-generalised rule. Similarly, the principle is applied to three subjects who each produced,

respectively, one instance of the form "fours chickens", "threes board" and "five womans".

Other contexts occur mainly in the possessive –s and inter-phrasal –s categories where subjects used the preposition *of* instead of the *-'s*, and the interlanguage form Subject+'s + Verb (*He's play*). Instances of the latter form (Subject+'s + Verb) are subject to various interpretations. One of the possible interpretations is that these instances could not be those of over-generalisation of the 3rd-person-singular –s, but rather instances of a contraction of the auxiliary *is* followed by an unmarked verb in the progressive aspect (e.g. *He's play* represents *He (i)s play(ing)* rather than *He plays*). However, this possibility is difficult to confirm as relying solely on the supplied contexts is not sufficient, and determining whether subjects have learned or acquired the function of progressive feature is out of reach of the present study.

Tables 4.1 to 4.10 present the results of the data analysis in implicational scales, based on the emergence criterion for acquisition discussed above: two rule-application tokens and types in at least five linguistic contexts plus at least one contrasting singular/plural form. In these tables, except tables 4.6 and 4.8, the tested structures are arranged in columns, from left to right according to the processability hierarchy for English proposed by Pienemann (1998: 171), i.e. lexical (plural)-s then phrasal-s (which includes phrasal plural-s and possessive-s) then inter-phrasal-s (3rd-person-singular-s), and subjects are arranged in rows, in descending order of the number of lexical and morphological variability produced by each subject.

These tables are presented in the next two sections, section 4.4.1 and 4.4.2, which examine the assumptions stated by the two Null Hypotheses listed in section 4.2.

4.4.1 Verbal Morphology: the Inter-phrasal 3rd-person-singular –s

This section tests the Null Hypothesis 1 which assumes the inter-phrasal 3rd-person-singular –s morpheme does not require prior acquisition of the lexical plural –s, the phrasal plural –s and the possessive –s. The section presents the implicational relationship between each of these three nominal morphemes –s and the inter-phrasal 3rd-person-singular-s morpheme. In tables 4.1 to 4.3, the examined structure lexical plural -s or phrasal plural -s or possessive -s is arranged in the left column and the inter-phrasal 3rd-person-singular-s is in the right column; and each row represents a subject's production of the morpheme. A plus sign indicates subject's production meets the emergence criterion for acquisition of processing prerequisites, and a minus sign indicates that it does not. Also in these tables, the first four rows are in descending order of the number of productions and contexts with respect to the four subjects that met the emergence criterion for acquisition of the 3rd-person-singular –s morpheme. The remaining rows are in descending order of subjects whose production of one of the three nominal -s structures that is being compared with the inter-phrasal –s meets the criterion.

Tables 4.1, 4.2 and 4.3 respectively indicate an implicational relationship between each of the three nominal morphemes –s and the inter-phrasal-s among all subjects, as the absolute values of 1.0000 of coefficients in both reproducibility and scalability show.

Table 4.1: All subjects, Lexical Plural-s versus Inter-Phrasal-s

	Subject	Lexical Plural –s	Inter-Phrasal-s
1	HD	+	+
2	VA	+	+
3	HAu	+	+
4	TTr	+	+
5	TH	+	-
6	PHL	+	-
7	XD	+	-
8	QB	+	-
9	HAn	+	-
10	HL	+	-
11	NTi	+	-
12	BT	+	-
13	VC	+	-
14	DT	+	-
15	TTu	+	-
16	HT	+	-
17	TrHu	+	-
18	MD	+	-
19	KH	+	-
20	TA	+	-
21	NHL	+	-
22	ThHu	+	-
23	NTr	+	-
24	MH	+	-
25	TN	+	-
26	KiA	+	-
27	KyA	-	-
28	NTh	-	-
29	KV	-	-
30	BK	-	-
31	MN	-	-
32	XT	-	-
33	AT	-	-
34	DP	-	-
35	YN	-	-
36	MT	-	-

Convention: + processing prerequisites acquired
- processing prerequisites not-acquired

Errors: 0 **Reproducibility** = 1.000 **Scalability** = 1.000

Table 4.2: All subjects, Phrasal Plural-s versus Inter-Phrasal-s

	Subject	Phrasal Plural -s	Inter-Phrasal -s
1	HD	+	+
2	VA	+	+
3	HAu	+	+
4	TTr	+	+
5	TH	+	-
6	BT	+	-
7	MH	+	-
8	KiA	+	-
9	HAn	+	-
10	QB	+	-
11	XD	+	-
12	DP	+	-
13	HL	+	-
14	HT	+	-
15	PHL	+	-
16	KyA	+	-
17	MD	+	-
18	DT	+	-
19	BK	+	-
20	VC	+	-
21	NTr	+	-
22	NTi	+	-
23	NHL	+	-
24	TTu	+	-
25	TA	+	-
26	XT	+	-
27	MT	+	-
28	TrHu	+	-
29	YN	+	-
30	KH	+	-
31	NTh	-	-
32	ThHu	-	-
33	MN	-	-
34	AT	-	-
35	KV	-	-
36	TN	-	-

Convention: + processing prerequisites acquired
- processing prerequisites not-acquired

Errors: 0 **Reproducibility** = 1.000 **Scalability** = 1.000

Table 4.3: All subjects, Possessive-s (PO-s) versus Inter-Phrasal-s (IP-s)

	Subject	Possessive –s	Inter-Phrasal -s
1	HD	+	+
2	VA	+	+
3	HAu	+	+
4	TTr	+	+
5	DP	+	-
6	TH	+	-
7	ThHu	+	-
8	BT	+	-
9	PHL	+	-
10	QB	+	-
11	KV	+	-
12	XD	+	-
13	NTi	+	-
14	HT	+	-
15	BK	+	-
16	KiA	+	-
17	MD	+	-
18	NHL	+	-
19	HAn	+	-
20	TA	+	-
21	KyA	+	-
22	HL	+	-
23	DT	+	-
24	VC	-	-
25	TTu	-	-
26	MT	-	-
27	MH	-	-
28	NTr	-	-
29	MN	-	-
30	TrHu	-	-
31	NTh	-	-
32	TN	-	-
33	AT	-	-
34	XT	-	-
35	YN	-	-
36	KH	-	-

Convention: + processing prerequisites acquired
- processing prerequisites not-acquired

Errors: 0 **Reproducibility** = 1.000 **Scalability** = 1.000

Table 4.4 below shows the implicational relationship among the three proposed acquisition stages of the three morpheme -s, lexical –s, phrasal -s (which includes the phrasal plural –s and the possessive –s) and inter-phrasal –s. In this table, subjects who have acquired **either** the phrasal –s, i.e. either the phrasal plural-s or the possessive-s, are considered as having acquired the phrasal stage. The table shows that there were seven subjects who had not acquired the lexical -s on their way to acquiring either of the two phrasal structures. This result yields low reproducibility and scalability values, .871 and .227 respectively, thus it does not constitute an implicational scale.

Table 4.4: All subjects, Lexical Plural-s (LP-s) versus Phrasal-s (PP-s/PO-s) versus Inter-Phrasal-s (IP-s): at least 1 + cell in either PP *or* PO to be counted as + in PP-s *or* PO-s column

	Subject	LP-s	Phrasal-s (+)			IP-s
			PP-s	PO-s	PP-s *or* PO-s	
1	HD	+	+	+	+	+
2	VA	+	+	+	+	+
3	HAu	+	+	+	+	+
4	TTr	+	+	+	+	+
5	TH	+	+	+	+	-
6	PHL	+	+	+	+	-
7	BT	+	+	+	+	-
8	XD	+	+	+	+	-
9	QB	+	+	+	+	-
10	HAn	+	+	+	+	-
11	HL	+	+	+	+	-
12	NTi	+	+	+	+	-
13	DT	+	+	+	+	-
14	HT	+	+	+	+	-
15	MD	+	+	+	+	-
16	TA	+	+	+	+	-
17	NHL	+	+	+	+	-
18	KiA	+	+	+	+	-
19	VC	+	+	-	+	-
20	TTu	+	+	-	+	-
21	TrHu	+	+	-	+	-
22	KH	+	+	-	+	-
23	ThHu	+	-	+	+	-
24	NTr	+	+	-	+	-
25	MH	+	+	-	+	-
26	TN	+	-	-	-	-
27	KyA	-	+	+	+	-
28	DP	-	+	+	+	-
29	BK	-	+	+	+	-
30	KV	-	-	+	+	-
31	XT	-	+	-	+	-
32	MT	-	+	-	+	-
33	YN	-	+	-	+	-
34	NTh	-	-	-	-	-
35	MN	-	-	-	-	-
36	AT	-	-	-	-	-

Convention: + processing prerequisites acquired
- processing prerequisites not-acquired

Shaded cells: errors **Errors**: 14 **Reproducibility** = .871 **Scalability** = .227

To summarise, in this section 4.4.1, we looked at the relationship between acquisition of the three nominal morphemes –s and the inter-phrasal morpheme –s. The results from the above implicational analysis show that, Vietnamese learners of EFL acquire all of the three nominal morphemes –s, i.e the lexical plural –s, the phrasal plural –s and the possessive –s before acquiring the inter-phrasal –s. This is confirmed by the well-above cut-off points of .90 and .60 of the coefficients of reproducibility and scalability in tables 4.1 to 4.3, where the three nominal morphemes -s were examined separately against the inter-phrasal -s. These results thus reject Null Hypothesis 1 which assumes the inter-phrasal 3rd-person-singular –s morpheme does not require prior acquisition of the lexical plural –s, the phrasal plural –s and the possessive –s.

However, as examined in table 4.4, the relationship predicted by PT among the three nominal morphemes –s, namely the lexical plural –s, the phrasal plural –s and the possessive –s, does not show implicational scalability. In the next section, we will look more closely at this relationship among these three nominal morphemes –s.

4.4.2 Nominal Morphology: Lexical Plural –s, Phrasal Plural –s, Possessive –s

This section tests the Null Hypothesis 2 which states that the acquisition of the three nominal morphemes –s does not follow PT's predicted developmental sequence of lexical > phrasal. In other words, the two developmental stages, 2 and 3, are examined in these analyses. Tables 4.5 to 4.10 show the relationships between any two of these three nominal morphemes. These relationships are studied in a two-way manner, first as developmentally proposed by PT, for example the lexical plural –s versus the phrasal plural –s or the lexical plural –s versus the possessive -s, and if Null Hypothesis 2 is confirmed, then in the reverse order in order to establish if there is a better fit order.

Tables 4.5 to 4.9 show the implicational relationship between the lexical (plural)-s, assumed by PT to emerge at stage 2, and the phrasal –s (phrasal plural-s and possessive-s), assumed to emerge at stage 3.

Table 4.5 shows a non-reproducible and non-scalable relationship between the lexical plural-s and the phrasal plural-s, with the coefficient of reproducibility .834 and scalability .255 well-below the cut-off points of .90 and .60 respectively. This is because there are six subjects who did not acquire the lexical plural-s prior to acquiring the phrasal plural-s. Among these six learners who had acquired the phrasal plural, three *never* produced the lexical plural; that is evidence for non-acquisition (in the sense that these learners appeared to be unable to produce the structure, as they did not produce it), while the other three produced *one* token of the lexical plural, thus neither reaching the criterion of acquisition nor evidence for non-acquisition (in the sense that their production of one token may represent the onset of emergence OR be a 'genuine' slip of the tongue). Similarly, between the remaining two learners who had acquired the lexical plural, one never produced the phrasal plural, and the other produced only one token of the phrasal plural. The status of indeterminacy with regard to these latter learners (who produced only one token of either lexical or phrasal plural) could not be handled by Guttman's procedure. However, it is my view that those learners whose acquisition was indeterminate should not be omitted from the data sample; otherwise the results in the present study would show a perfect 100% reproducibility and scalability as in the case of Johnston's (1997) study.

Thus, from this very first analysis, Null Hypothesis 2 is confirmed: the acquisition of the three nominal morphemes –s by Vietnamese learners of EFL does not follow PT's predicted developmental sequence. This leads to the next question, is there an acquisition order among these three nominal morphemes –s in Vietnamese

learners of EFL? If yes, then in what order do they develop? And if not, then are the three morphemes a variational feature?

Table 4.6 shows the relationship between the lexical plural –s and the phrasal plural -s in the reverse order. The result displays a high percentage of reproducibility, .945, and scalability, .753, indicating that in 94.5 percent of the time, we could accurately expect a Vietnamese learner of EFL to acquire the phrasal plural-s ***before*** the lexical plural-s. However, as also seen in this table, there are two learners, ThHu and TN (numbered 31 and 32), who did in fact appear to follow the PT sequence. This is the result of following Guttman's procedure and using the 60% and 90% cut-off points: these two learners fall under the table as it were. Thus, it should be clear that as a *consequence* of the methodology that I have adopted, a different *order* of acquisition of the nominal morphology, rather than a *variational feature* as Johnston (1997) suspected, has been found [8].

[8] In her Discussion Paper presented at a PT workshop, Jansen (2004) suggested that only a 100% fit, not 90% cut-off point, should be used when applying implicational scaling to determine developmental feature in a PT context. Nonetheless, following this stricter criterion (which does not leave room for errors) would lead to the conclusion that acquisition of the nominal morphemes being investigated is variational rather than developmental. As Jansen's (2004) suggestion was a Discussion Paper with the discussion still outstanding, it would be very useful if there is further research into or discussion on the matter.

Tables 4.7 and 4.8 show the two-way relationship between the lexical plural-s and the possessive-s. Both indicate a non-valid reproducibility of below .90; therefore fail to achieve an implicational relationship in either way although table 4.8 has a slightly acceptable scalability, .653 or 65%.

Tables 4.9 and 4.10 show the relationship between the phrasal plural-s and the possessive-s that presumably occur within the same stage, stage 3. Table 4.9 shows that there is a 94.5% reproducibility and a 79% scalability that the phrasal plural-s will emerge before the possessive-s. Table 4.10 confirms this result, when put in the reverse order with the possessive –s before the phrasal plural –s, both the reproducibility and scalability coefficients fall well below their respective valid cut-off points of .90 and .60. However, these results do not contradict PT's prediction as these two morphemes are instantiations of one and the same stage, i.e., variational with respect to one another <u>within</u> that stage.

Table 4.5: All subjects, Lexical Plural–s versus Phrasal Plural–s

	Subject	Lexical Plural -s	Phrasal Plural -s
1	HD	+	+
2	VA	+	+
3	HAu	+	+
4	TTr	+	+
5	TH	+	+
6	PHL	+	+
7	BT	+	+
8	XD	+	+
9	QB	+	+
10	HAn	+	+
11	HL	+	+
12	NTi	+	+
13	DT	+	+
14	HT	+	+
15	MD	+	+
16	TA	+	+
17	NHL	+	+
18	KiA	+	+
19	VC	+	+
20	TTu	+	+
21	TrHu	+	+
22	KH	+	+
23	NTr	+	+
24	MH	+	+
25	ThHu	+	-
26	TN	+	-
27	KyA	-	+
28	DP	-	+
29	BK	-	+
30	XT	-	+
31	MT	-	+
32	YN	-	+
33	KV	-	-
34	NTh	-	-
35	MN	-	-
36	AT	-	-

Convention: + processing prerequisites acquired
- processing prerequisites not-acquired

Shaded cells = errors **Errors**: 12

Reproducibility = .834 **Scalability** = .255

Table 4.6: All subjects, Phrasal Plural-s versus Lexical Plural-s

	Subject	Phrasal Plural –s	Lexical Plural –s
1	HD	+	+
2	VA	+	+
3	HAu	+	+
4	TTr	+	+
5	TH	+	+
6	PHL	+	+
7	BT	+	+
8	XD	+	+
9	QB	+	+
10	HAn	+	+
11	HL	+	+
12	NTi	+	+
13	DT	+	+
14	HT	+	+
15	MD	+	+
16	TA	+	+
17	NHL	+	+
18	KiA	+	+
19	VC	+	+
20	TTu	+	+
21	TrHu	+	+
22	KH	+	+
23	NTr	+	+
24	MH	+	+
25	KyA	+	-
26	DP	+	-
27	BK	+	-
28	XT	+	-
29	MT	+	-
30	YN	+	-
31	ThHu	-	+
32	TN	-	+
33	KV	-	-
34	NTh	-	-
35	MN	-	-
36	AT	-	-

Convention: + processing prerequisites acquired
- processing prerequisites not-acquired

Shaded cells = errors **Errors**: 4

Reproducibility = .945; **Scalability** = .753

Table 4.7: All subjects, Lexical Plural-s versus Possessive-s

	Subject	Lexical Plural -s	Possessive -s
1	HD	+	+
2	VA	+	+
3	HAu	+	+
4	TTr	+	+
5	TH	+	+
6	PHL	+	+
7	BT	+	+
8	XD	+	+
9	QB	+	+
10	HAn	+	+
11	HL	+	+
12	NTi	+	+
13	DT	+	+
14	HT	+	+
15	MD	+	+
16	TA	+	+
17	NHL	+	+
18	KiA	+	+
19	ThHu	+	+
20	VC	+	-
21	TTu	+	-
22	TrHu	+	-
23	KH	+	-
24	NTr	+	-
25	MH	+	-
26	TN	+	-
27	KyA	-	+
28	DP	-	+
29	BK	-	+
30	KV	-	+
31	XT	-	-
32	MT	-	-
33	YN	-	-
34	NTh	-	-
35	MN	-	-
36	AT	-	-

Convention: + processing prerequisites acquired
- processing prerequisites not-acquired

Shaded cells = errors **Errors**: 8

Reproducibility = .889 **Scalability** = .653

Table 4.8: All subjects, Possessive-s versus Lexical Plural-s

	Subject	Possessive -s	Lexical Plural –s
1	HD	+	+
2	VA	+	+
3	HAu	+	+
4	TTr	+	+
5	TH	+	+
6	PHL	+	+
7	BT	+	+
8	XD	+	+
9	QB	+	+
10	HAn	+	+
11	HL	+	+
12	NTi	+	+
13	DT	+	+
14	HT	+	+
15	MD	+	+
16	TA	+	+
17	NHL	+	+
18	KiA	+	+
19	ThHu	+	+
20	KyA	+	-
21	DP	+	-
22	BK	+	-
23	KV	+	-
24	VC	-	+
25	TTu	-	+
26	TrHu	-	+
27	KH	-	+
28	NTr	-	+
29	MH	-	+
30	TN	-	+
31	XT	-	-
32	MT	-	-
33	YN	-	-
34	NTh	-	-
35	MN	-	-
36	AT	-	-

Convention: + processing prerequisites acquired
- processing prerequisites not-acquired

Shaded cells = errors **Errors**: 14

Reproducibility = .806 **Scalability** = .393

Table 4.9: All subjects, Phrasal Plural-s versus Possessive-s

	Subject	Phrasal Plural -s	Possessive –s
1	HD	+	+
2	VA	+	+
3	HAu	+	+
4	TTr	+	+
5	TH	+	+
6	PHL	+	+
7	BT	+	+
8	XD	+	+
9	QB	+	+
10	HAn	+	+
11	HL	+	+
12	NTi	+	+
13	DT	+	+
14	HT	+	+
15	MD	+	+
16	TA	+	+
17	NHL	+	+
18	KiA	+	+
19	KyA	+	+
20	DP	+	+
21	BK	+	+
22	VC	+	-
23	TTu	+	-
24	TrHu	+	-
25	KH	+	-
26	NTr	+	-
27	MH	+	-
28	XT	+	-
29	MT	+	-
30	YN	+	-
31	KV	-	+
32	ThHu	-	+
33	TN	-	-
34	NTh	-	-
35	MN	-	-
36	AT	-	-

Convention: + processing prerequisites acquired
- processing prerequisites not-acquired

Shaded cells = errors **Errors**: 4

Reproducibility = .945 **Scalability** = .791

Table 4.10: All subjects, Possessive-s versus Phrasal Plural-s

	Subject	Possessive -s	Phrasal Plural –s
1	HD	+	+
2	VA	+	+
3	HAu	+	+
4	TTr	+	+
5	TH	+	+
6	PHL	+	+
7	BT	+	+
8	XD	+	+
9	QB	+	+
10	HAn	+	+
11	HL	+	+
12	NTi	+	+
13	DT	+	+
14	HT	+	+
15	MD	+	+
16	TA	+	+
17	NHL	+	+
18	KiA	+	+
19	KyA	+	+
20	DP	+	+
21	BK	+	+
22	KV	+	-
23	ThHu	+	-
24	VC	-	+
25	TTu	-	+
26	TrHu	-	+
27	KH	-	+
28	NTr	-	+
29	MH	-	+
30	XT	-	+
31	MT	-	+
32	YN	-	+
33	TN	-	-
34	NTh	-	-
35	MN	-	-
36	AT	-	-

Convention: + processing prerequisites acquired
- processing prerequisites not-acquired

Shaded cells = errors **Errors**: 18

Reproducibility = .750 **Scalability** = .053

4.4.3 Results Summary

Of the four implicational analyses of the relationship between the English nominal morphemes –s and the verbal morpheme –s, in tables 4.1 to 4.4, three have shown solid cross-sectional evidence that prior to being able to process the inter-phrasal –s, Vietnamese learners of EFL have to acquire all three nominal morphemes –s, namely the lexical plural-s, the phrasal plural-s and the possessive-s. These results reject Null Hypothesis 1, thus lend strong support toward PT's prediction, and Johnston's conclusion from his data, that the English inter-phrasal morpheme –s is a developmental feature.

Within the three structures of the nominal morpheme -s, results do not agree with the developmental sequence predicted by PT, thus confirming Null Hypothesis 2. These results also reject Johnston's (1997) assumption that the relationship between the three nominal morphemes –s is variational. Table 4.11 below highlights these results, where '<' indicates an implicational scale and '<>' a non-implicational one.

Table 4.11: Nominal morphemes -s: results summary

Structures	Reproducibility	Scalability
Lexical Plural-s <> Phrasal Plural-s	.834	.255
Phrasal Plural-s < Lexical Plural-s	.945	.753
Lexical Plural-s <> Possessive-s	.889	.653
Possessive-s <> Lexical Plural-s	.806	.393
Phrasal Plural-s < Possessive-s	.945	.791
Possessive-s <> Phrasal Plural-s	.750	.053

Accordingly, the following implicational order of the acquisition of the English formative –s is found in Vietnamese subjects of the present study:

	Phrasal –s	<	Lexical –s	<	3rd-person-singular-s
	Quantified N-plural/ Possessive -s	<	Bare N-plural	<	Verbal 3rd-ps-sg
eg:	*"two dogs"* *"Mary's dog"*	<	*"I like dogs"*	<	*"He owns ...."*

In the next section, explanations for these developmental relationships are sought and discussed.

4.5 Discussion

Testing PT's Procedural Skills hypothesis (Pienemann, 1998: 215), this thesis is to find the answer to the research question whether in formal Vietnamese adolescent learners (aged 13 to 18) the task of acquiring the English verbal and nominal morphemes '-s' in an instructed foreign setting is based on the acquisition of the procedural skills needed for the processing of the language. More specifically, the research question for the present production study is whether formal Vietnamese learners of EFL acquire those English structures according to PT's proposed processing hierarchy applied to English (Pienemann, 1998: 171).

The results of the present study show partially a same and partially a different developmental order from that proposed in PT, where Vietnamese learners of EFL acquired the nominal phrasal marking first, then the nominal lexical plural marking and finally the inter-phrasal verbal –s marking.

This section provides possible explanations for these results by using relevant theories and/or other studies, and considers how the results of the present study relate to those of others.

4.5.1 Possible Explanations Using Relevant Theories and/or Other Studies

First and foremost, it must be stressed that PT's prediction of the developmental status of the inter-phrasal 3rd-person-singular verbal marking –s is strongly supported by the results of the present study. The fact that, at the time of the test, 32 out of 36 subjects had not acquired the inter-phrasal 3rd-person-singular –s and the 4 subjects who acquired the feature had also acquired the other three nominal –

s structures prior to their acquiring the inter-phrasal –s, confirms PT's assumption that the inter-phrasal –s involves a *processing cost* (Pienemann, 1998: 111-115).

As regards the found different order of acquisition of the three nominal –s markers, possible explanations can, and in fact have, come from various sources.

First of all, within the framework of PT, one might argue that the English morpheme –s represents a case where one form maps to more than one function, i.e. plural (lexical and phrasal), possessive and 3rd-person-singular, therefore it may not be an 'ideal' candidate for a test as in the present study. Mansouri and Håkansson (in press) put forward a suggestion that, as there is often more than one morphological/syntactic structure within a processing stage in PT, there is a need for one structure to be representative of that particular stage, hence the term *optimal structure*. This optimal structure is the best 'candidate' for any study that opts to test various stages of PT, such as the present study. And this is a possible argument against the present study, for example, as the lexical plural may not be an optimal structure for testing the emergence of stage 2 in PT. However, concrete proposals are needed for the optimal structure of each stage before these can be tested.

Secondly, as mentioned in Chapter 3, since Johnston's (1997) study, the processing order of the English nominal morphology proposed in PT has been under question. In the first ESL study conducted within the PT framework, Johnston (1997: 269) concluded that "... In regard to nominal inflectional morphology, it is possible that the traditional morpheme order study of difficulty or acquisition is erroneous, given that there exist substantial doubts about the developmental status of these markers. There is some evidence that regular plural marking may be a variational feature. Due to lack of data the status of the genitive is unclear, but,

equally, it may not be developmental in nature". This suggests the vulnerable position of PT's prediction of the processing order of the English nominal markers. By the same token, if these markers constitute a variational feature then their emergence will vary, for example, subject to different conditions under which acquisition takes place.

One of these conditions might be the instructed environment that these Vietnamese learners were in at the time of the testing. In her study to test if the accuracy/acquisition order of a described set of English morphemes was equally true between *instructed* and *naturalistic* learners, Pica (1983, summarised in Chapter 3) found that the plural morpheme –s and the 3rd-person-singular -s were performed more accurately by instructed learners than by naturalistic ones. Accordingly, Pica (1983: 488) suggested that formal instruction might play a role in learners' acquisition of these "easy-to-learn morphemes" [9], and in inhibiting their production of ungrammatical constructions. This argument is challenged by the very term "easy-to-learn", which Pica (1983) adopted from Krashen (1977b). In PT, the phrasal plural –s **is** a 'difficult-to-learn' feature in relation to the lexical plural –s because the former requires information exchange and therefore feature unification between the modifier and the noun, whereas the latter does not. Thus Pica's (1983) suggestion of an influence of instruction can not apply to the results of the present study as it can not explain why the phrasal plural –s emerged before the lexical plural -s.

---

[9] In the sense that these morphemes have "transparent form-function relationship" (Pica, 1983:488).

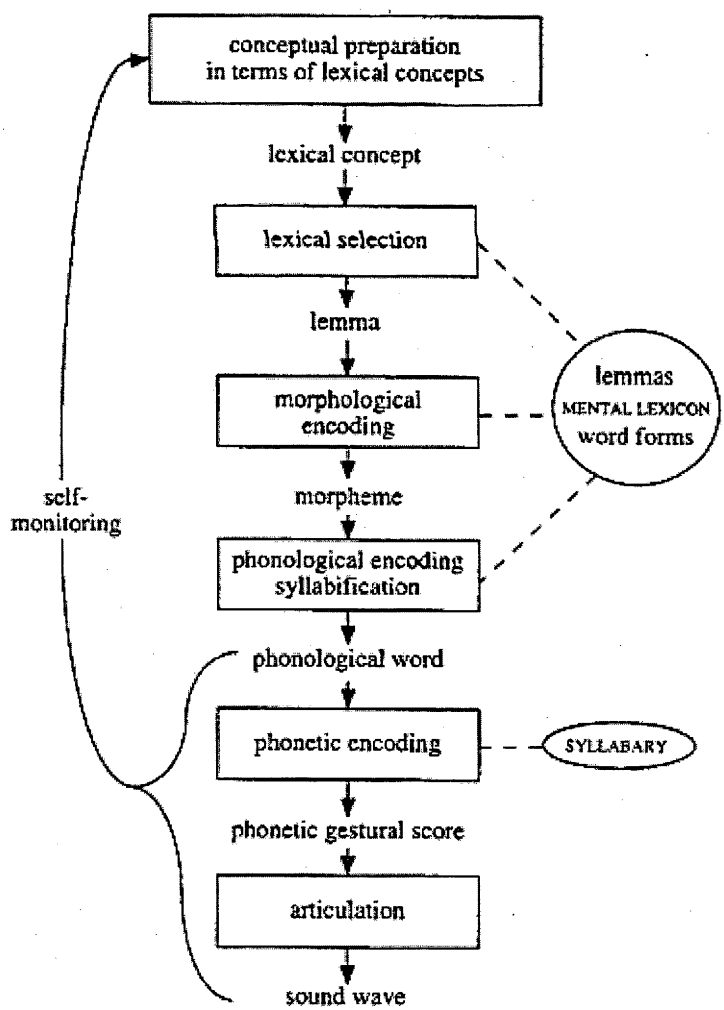
Contributing to this debate of morphological variation in learners' interlanguage is Young's (1991) cross-sectional study on the production of the English plural morpheme –s in the speech of 12 adult Chinese speakers of ESL at mixed levels of English proficiency, in Philadelphia, US. Young's (1991) study followed the results of his earlier study in 1986 (summarised in chapter 3, section 3.3.3), where the plural morpheme –s was found having the highest accuracy scores in learners' conversation with native speakers. Apart from considering transfer from informants' L1 as a factor in accounting for their speech variation, Young's (1991: 50) study also aimed at addressing whether or not the following factors contributed to the morphological variation: (i) how systematic the variation in inflectional morphology found in learners' interlanguage is, (ii) if the variation is found systematic, then how it changes with the acquisition process, and (iii) to what extent the factors of linguistic environment (semantic, syntactic and phonological), context of situation (psychological), stage of acquisition (developmental) and communicative redundancy (number maybe marked by other elements in the NP), contributed to morphological variation in learners' interlanguage.

Results of the multivariate analysis of Young's (1991: 162-164) data showed that, (i) the variation in inflectional morphology, especially in prototypical expressions of plural, found in learners' interlanguage is systematic; (ii) variation changed as acquisition of the form proceeded; and (iii) variation was influenced by the factors of linguistic environment, interlanguage development and communicative redundancy, but not by the context of situation (psychological) factor. More significantly, and most related to the present results and discussion, was Young's finding that, in native speakers of Chinese, especially in the low proficiency learners, the plural –s marking "occurs most often in measure expressions in which

concord between numerals or quantifiers and the noun plural inflection appears to be a prototypical application of plural marking" (Young, 1991: 164).

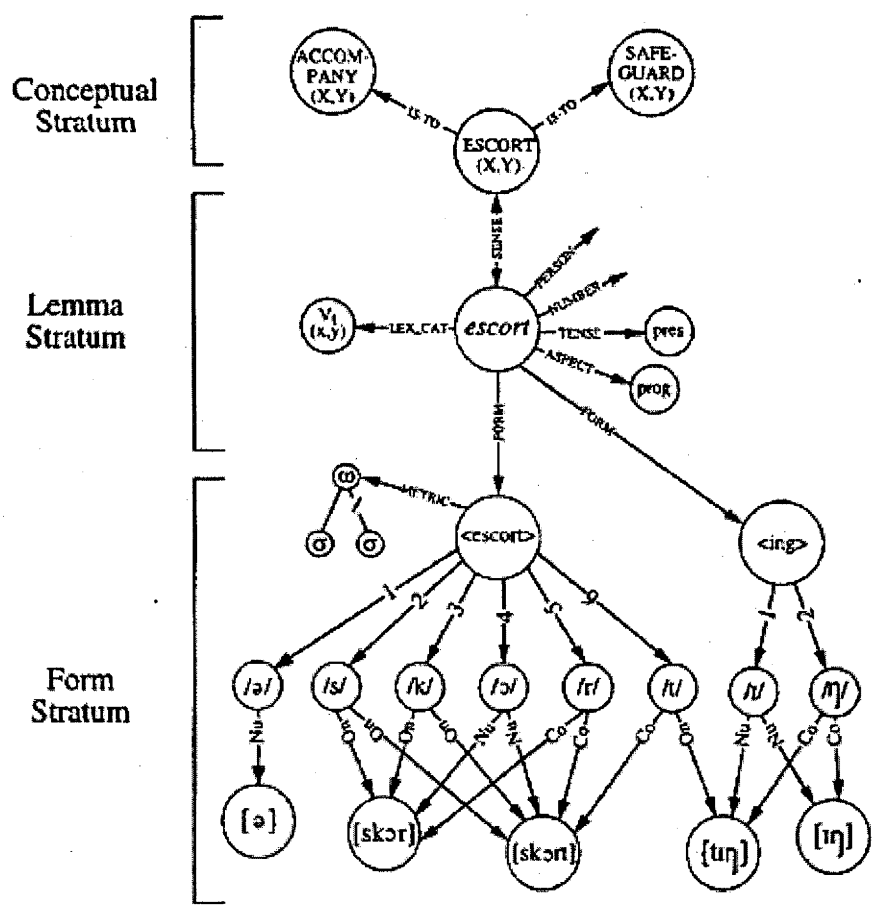
In an attempt to find a possible answer to the similarity in the findings between Young's (1991) and the present study, Charters, Dao and Jansen (forthcoming) use the very two theories incorporated in PT (Lexical Functional Grammar (Kaplan and Bresnan, 1982) and Theory of Speaking (Levelt, 1989)), and especially the Weaver++ model in the Theory of Lexical Access in Speech Production by Levelt, Roelofs and Meyer (1999), outlined in figure 4.3 below.

Figure 4.3: Levelt et al's (1999: 3) outlined Theory of Lexical Access in Speech Production



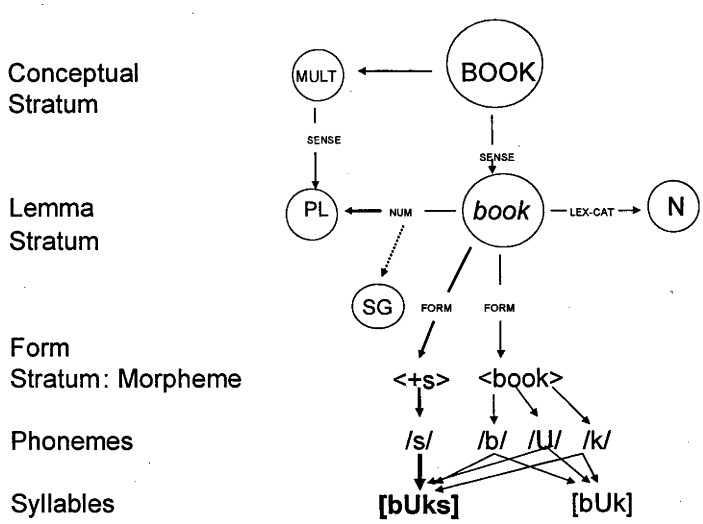
Levelt et al.'s (1999: 4) model is a "feedforward activation spreading" model of a neural network of ***nodes*** and ***links*** for language processing, expanded from Levelt's (1989) model of speaking. An example of this model for the English word *escort* is depicted in figure 4.4 below. This model assumes *three strata* in the lexical network underlying lexical access in speech production: nodes in the *conceptual stratum* represent lexical concepts, nodes in the *lemma stratum* represent lemmas and their syntactic properties, and nodes in the *form stratum* represent morphemes and their phonemic segments as well as their syllables. According to Levelt et al. (1999: 8), lexical concepts form the "terminal vocabulary" of the speaker's message construction at the conceptual level, and the terminal vocabulary is, "to some extent, language specific."

Figure 4.4: Fragment of the lexical network underlying lexical access (Levelt et al., 1999: 4)



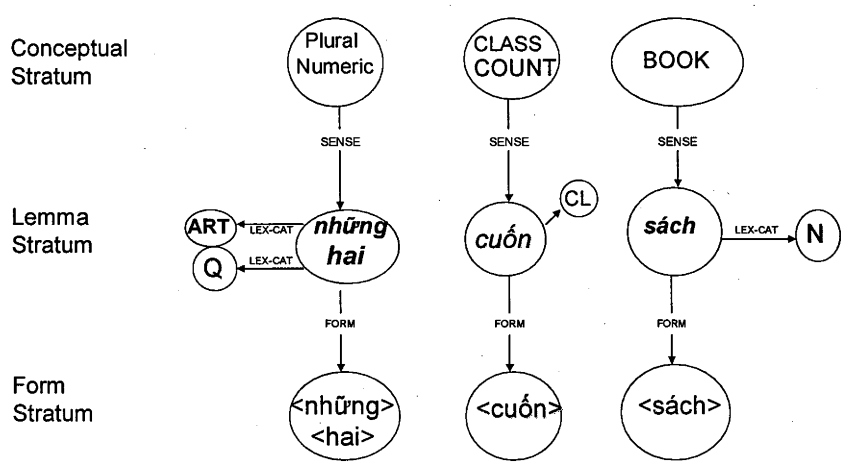
Following the Weaver++ model, Charters et al. depict a representation of the English noun *'books'* in a native speaker as in figure 4.5: the conceptual stratum generates lexical concepts to represent the lexemes and grammatical morphemes with semantic content in a speaker's message, in this case, BOOK and a concept called 'MULTiple'; activation then spreads from the lexical concepts to nodes in the lemma stratum, where the lemma *'book'* is identified as a noun, and its 'NUMBER' feature with two value nodes 'plural' and 'singular' is activated. In this model, the most highly activated node will be selected. As the 'plural' node is activated by two links (from 'MULTiple' in the conceptual stratum and from *'book'* in the lemma stratum), and the 'singular' node is activated by only one link (from *'book'*), 'plural' is selected. Then activation flows to the form stratum, where stored morphemes, speech sounds and syllables are activated. The <s> morpheme activates the /s/ phoneme, which in turn contributes to the activation of the syllabic form [bUks] but not to [bUk]. This explains how the form [bUks] is selected.

Figure 4.5: English Plural inflection in Weaver++ model (Charters et al., forthcoming)



Using this model in native speakers, Charters et al. explain how L1 transfer could account for the emergence order brought out by the findings of the present study. In Vietnamese, NUMBER is processed differently because NUMBER is not morphologically marked on Nouns. A bare noun, for example '*sách*' (book), can be used to refer to one or many entities. This is called a general number system. An explicit plural meaning is realised by plural articles such as '*những*' ('*những cuốn sách*' - 'the.plural classifier books'), or by numerals such as '*hai*' (two), and must be accompanied by a classifier, '*cuốn*', which indicates countability. The classifier appears with the numeral 'one' as well as with all higher numbers. Thus, applying the Weaver++ model to Vietnamese, countability and noun classifier are expressed by a single lexical item so we see a single lexical concept, CLASS-COUNT, which activates a single lemma '*cuốn*', and a single form <cuốn>. Hence, the Vietnamese plural is a combination of free words with a lemma each, and there are no links at the conceptual or at the lemma levels, as shown below.

Figure 4.6: Plural and numeric expressions in Vietnamese (Charters et al., forthcoming)



Therefore, in order to acquire the English plural system, a Vietnamese learner must go through the following five steps to learn to

(1) establish a 'MULTiple' lexical concept possibly via their Vietnamese countable entity concepts,
(2) link the 'plural' node to the Noun lemma,
(3) link the 'MULTiple' concept to the 'plural' node,
(4) link the 'plural' node to the <s> morpheme (instead of the article forms), and
(5) link the <s> morpheme to the syllables ending in /s/.

Proceeding from these five steps and from the present study's findings, Charters et al. suggest that Vietnamese learners acquire the English plural morpheme –s in three stages (see Table 4.12), and develop in detail, how and at which stage, each of the above five steps is taken while specifying the resulting interim interlanguage systems associated with each stage in terms of Levelt et al.'s (1999) framework.

Table 4.12: Three stages of acquiring the Plural -s in Vietnamese learners

	"books"	**"five books"/ "one book"**
Stage 1	*book*	*five book / one book*
Stage 2	*book*	*five books / one book*
Stage 3	*books*	*five books / one book*

In summary, Charters et al. suggest that (a) learners whose L1 does not mark number on Nouns must restructure their Conceptual Stratum and the Noun Lemmas in their mental lexicon in order to mark Number on the Noun through a Noun Suffix; (b) early plural marking in numeric contexts does not involve grammatical agreement as the Numeral corresponds directly to a Plural concept. At this stage, the Noun+s is not marked for Plural, instead, it is hypothesized that

the marker –s is a Numeral ***Clitic*** rather than a Noun S***uffix***. Thus, there can be no grammatical agreement between the Noun and the Numeral, but rather a ***copy*** of the Numeral is attached to the Noun; and (c) Lexical-Functional Grammar (LFG) and the Weaver++ model (an extension of the Theory of Speaking (Levelt, 1989)), which are PT's central theoretical components, allow us to model this restructuring, providing a partial account of possible L1 transfer effects in the acquisition of English plural morphology.

The account by Charters et al. will need to be supported by further research with learners of similar as well as different L1s.

4.5.2 Connections to Other Studies

In this section, attempts to relate the results of the present study and their interpretations to other studies of similar linguistic structures, such as that of Jiang (2004), Hansen (2004), Goad, White and Steele (2003), Goad and White (2006), Bliss (2006), are presented.

Firstly, the above interpretation by Charters et al. (forthcoming) suggests another question for PT, that of its premise that L2 knowledge is implicit in nature (Pienemann, 1998: 54-61). This suggestion is supported by Jiang (2004: 603), who studied Chinese ESL learners' morphological performance in reading comprehension tasks, found that his learners were "not sensitive to number disagreement, but sensitive to other idiosyncrasies tested. This insensitivity to the number morpheme suggests that their morphological knowledge is not an integrated part of their automatic second language competence".

Next, another aspect arising from the results of the present study will be looked at in relation to other studies: the phonological aspect. Readers might recall that in

the Introduction chapter, the work of Sato (1984, 1985), Benson (1988), Osburne (1996) and Hansen (2004) on the production and acquisition of English phonology by Vietnamese learners has been mentioned. Hansen's (2004) study in particular, along with a recent approach in explaining the influence of L1 phonology on ESL production, the Prosodic Transfer Hypothesis (Goad et al., 2003; Goad and White, 2006), will be discussed to demonstrate the relationship between these studies and the present study.

In her longitudinal study of the production of English codas by two Vietnamese learners of English, Hansen (2004) found that for singleton codas, the voiceless fricative /s/ emerged before, and was produced more accurately than, the voiced fricative /z/, and posited that "... developmental effects may explain why voiceless fricatives emerge before voiced stops and voiced fricatives, as all three groups of consonants are allowed syllable initially but not finally in Vietnamese." (Hansen, 2004: 113). These developmental effects were also said to apply to longer codas which consist of two or more consonants codas and involve those voiced and voiceless fricatives, e.g. /nz, rz, ks/ as in *chickens, doors* and *books*.

Another explanation of the findings of Hansen's (2004: 118) study stated that the preceding grammatical conditioning constrains the development and production of these English syllable codas. This grammatical conditioning involves the inflectional morphemes -s as examined in the present study. In Hansen's (2004) study, the consonant codas where the last consonant is a morphological marker such as the plural –s were either produced more target-like or retained rather than being dropped. This, according to Hansen (2004: 119), "appears to indicate that the plural form is emerging in the participants' grammatical system and that there is a morphophonemic interface in their coda production". In addition, Hanson's (2004) learners' production of inflectional morpheme types such as the bimorphemic /d/

(e.g. play*ed*) was much more accurate than the monomorphemic /d/ (e.g. hea*d*) : 43% compared to 11%. To explain this, Hansen (2004: 119) posited that, because the "final /d/ is salient as a morphological marker ... participants pay more attention to it in production, whereas the plural form is not as salient, perhaps because of redundancy in the syntax."

However, Hansen's suggestion can not be applied here to explain why the inter-phrasal 3rd-person-singular –s was acquired last and by least subjects of the present study, and why the phrasal plural –s was acquired before the lexical -s. In relation to the inter-phrasal -s, if the final /d/ is salient as a morphological marker, and Hansen's (2004) participants paid more attention to it in their production, resulting in a 43% more accuracy, then the final /s/ or /z/ in the inter-phrasal 3rd-person-singular –s should also be considered as salient because of its morphological marker status and word-final position. In fact, the inter-phrasal –s has both characteristics suggested by Hansen (2004: 119), it is salient as well as redundant, expressed by the morphological marker ***and*** the 3rd-person-singular subject nouns, pronouns or noun phrases; yet there were only four subjects out of thirty-six in the present study who were able to acquire this structure.

As regards the plural morpheme -s, the data of the present study also counter-evidence Hansen's (2004) explanation of her participants' evenly (and relatively higher percentage) target-like production of the bimorphemic plural –s. The fact that the phrasal plural –s was found to emerge before the lexical plural –s in subjects of the present study suggests that, contrary to Hansen's (2004) assumption, it is possible that the redundancy in the phrasal plural –s, expressed by the numerals, does in fact facilitate, rather than hinder, the acquisition process of the phrasal plural –s in Vietnamese learners of EFL (cf. previous section, section 4.5.1, and Charters et al. (forthcoming)). As the present study only looks at final /s/

and /z/, there may be other reasons for the bimorphemic final /d/ to be produced more accurately by Hansen's (2004) subjects. One of these reasons is perhaps, according to PT, the morphological marker and final /d/ expresses a lexical feature (like the lexical plural –s) and therefore should emerge at as early as stage 2 in learners' developmental hierarchy. It would be fruitful to be able to analyse Hansen's (2004) data in PT's terms in order to clarify the above point.

Apart from finding that the emergence sequence of English syllable codas in two native speakers of Vietnamese was consistent across time, participants, and tasks, and from suggesting that the sequence is constrained by developmental effects as well as grammatical conditioning, Hansen (2004: 120) posits that the sequence is also constrained by L1 transfer effects. These effects were found when "initially, the learners' emerging L2 inventory consists of the sounds they transferred from their L1 and that those sounds were allowed syllable finally in the L1 (e.g., nasals and voiceless stops) emerge in syllable-final position in the L2 before other consonants" (Hansen, 2004: 113). The suggestion of *L1 transfer effects* in L2 production has been further investigated by Goad et al. (2003), and Goad and White (2006).

In their study of the production of English past tense and 3rd-person-singular agreement from Mandarin speaking learners of English, Goad et al. (2003), Goad and White (2006), found that although these learners showed a clear underlying knowledge of the grammatical structures through their writing tasks, their speech production was far from native-like. This, according to these researchers, was due to the "transfer of L1 prosodic constraints that affects inter language (IL) representations, with consequences for the production of inflectional morphology and function words, particularly during the course of development but also in the endstate" (Goad and White, 2006: 244).

From a "fine-grained phonetic analysis" of their Mandarin-speaking learners of English, Goad and White (2006: 265-266) proposed the Prosodic Transfer Hypothesis which claims that although "inflectional morphology requiring representations not instantiated in the L1 is initially problematic ... appropriate representations can be built in certain circumstances, through combining licensing relations available from the L1 grammar." More specifically, the hypothesis suggests that different prosodic structures in English and Chinese can account for native Chinese speakers' failure to supply the English inflectional morphemes.

Goad et al. (2003) pictured the difference by describing a prosodic structure for English inflection in which morphemes such as the regular past tense -ed and the third-person-singular –s are adjoined to the Prosodic Word, and a prosodic structure for Chinese in which the adjunction structure is absent. These researchers further explained that Chinese is characterised by minimal inflection, and when it does occur, it is adjoined at the Foot level, not at the Prosodic Word level as in English. It was the difference in prosodic structure that, according to Goad et al. (2003), constrained native Chinese speakers' ability to adjoin inflectional suffixes to the English Prosodic Word, thus causing their failure in supplying the regular past tense morpheme in their speech. This explanation allowed Goad et al. (2003) to predict that (i) for some native Chinese speakers, the realisation of inflectional morphemes in English would be impossible because it is not permitted in Chinese; and (ii) for other native Chinese speakers, the English inflectional morphemes would be supplied in a predictably variable pattern once these learners realised the structural difference between the two languages and started to prosodify those inflections as part of the English Prosodic Word. The results of Goad and White's (2006: 266) study support the Prosodic Transfer Hypothesis by showing that their Mandarin speaking learners of English "were indeed able to acquire the adjunction structure needed for English", and that "native-like representations are attainable."

The Prosodic Transfer Hypothesis has also been used to explain similar linguistic phenomenon in non-classifier languages. In his study of the acquisition of the Spanish plural by post-puberty L1 French speakers, Bruhn de Garavito (2007) found that while French learners seemed not to have any difficulty in acquiring the Spanish noun/adjective word order, they displayed variability in their production of the Spanish plural, although both languages exhibit strong number features. This contradiction, as argued by Bruhn de Garavito (2007: 274), can best be accounted for by L1 transfer, not at the level of functional categories but at the prosodic level as it is related to the acquisition of syllable structure.

As Vietnamese is also a classifier language as that of Goad et al.'s (2003) subjects, a "fine-grained phonetic analysis" of the speech production of these Vietnamese learners of English and its relation to the suggested Prosodic Transfer effect will possibly provide further explanations to the results of the present study. It is also worthwhile for future research to look into the acquisition of English phonology by Vietnamese learners and how this interacts with their acquisition of morphology (cf. Hansen, 2004). It is the latter question of the interaction of phonology and inflectional morphology in L2 acquisition that urged Bliss (2006) to analyse Jia's (2003) data (summarised in Chapter 3) and assess the Prosodic Transfer Hypothesis along with Lardiere's (2003) Consonant Cluster Reduction Hypothesis and Hawkins and Chan's (1997) Failed Functional Features Hypothesis, in relation to the transfer effects in L2 inflectional morphology. Based on the number and types of errors made by Jia's (2003) Chinese speaking learners, Bliss (2006: 3) suggested that only the Failed Functional Features Hypothesis, a morphosyntactic approach, could most comprehensively account for Chinese learners' acquisition of the English plural –s as it claimed that "morphosyntactic categories that are not activated in an L1 grammar will be inaccessible to the

learner in their L2". Research into this claim will also help to further explain the results of the present production study.

4.6 Conclusion and Directions for Future Research

This chapter has documented the study of the speech production of 36 Vietnamese learners of EFL within the framework of Processability Theory (Pienemann, 1998). In particular, the study aimed at testing the developmental hierarchy set out in PT's Procedural Skills Hypothesis in application to the English formative –s.

The results strongly support the Hypothesis in its prediction that the inter-phrasal 3rd-person-singular is a developmental marker. However, the hierarchy predicted for the other three nominal markers is not confirmed in that the phrasal plural –s was found emerging before the lexical plural –s.

The two theoretical frameworks which are incorporated into PT, Lexical Functional Grammar and Theory of Speaking, along with the Theory of Lexical Access in Speech Production, and various studies have been referred to in an attempt to give possible explanations for these results. Nonetheless, no matter how detailed these explanations are, further research is needed for each of these to be validated. In fact, the results of the present study have paved the way for various possible directions for future research.

The most immediate research direction takes root from the limitations of the present study. The fact that the present study is based on a cross-sectional database gives rise to a need for a longitudinal investigation. It is important that a longitudinal study is carried out with participants from the same (Vietnamese) or similar (classifier) or from a different L1 background, as well as from a non-instructed setting. This latter condition, a non-instructed setting, needs to be

considered in order to provide further evidence pertaining to the possible influence of input/instruction suggested by Pica (1983).

The second direction for future research stems from the work of Hansen (2004) and of Goad et al. (2003), Goad and White (2006), on the acquisition of English phonology by Vietnamese and Chinese learners. In this direction, learners' L1 phonological system should be explored and 'finely- grained analysed' in order to be able to confirm either (or both) Hansen's (2004) suggestion of a L1 transfer and/or Goad et al.'s (2003), Goad and White's (2006) hypothesis of a Prosodic Transfer. It would also require evidence from languages with a similar system to that of English to show that transfer is a likely explanation.

The third direction would be for future research to investigate a not-yet explored area, that of a possible interaction/relationship between phonology and morphology in the process of acquiring English by learners of classifier L1s. If this interaction/relationship is established by future research, research could then proceed further into other L1s.

In the next chapter, chapter five, the study on the reaction times, a supplement to the above production study, of the same subjects and of a control group of native speakers will be presented.

"The mind has set a trap for those who dare to build a model of it."

Lamb (1998:14)

CHAPTER 5

ON-LINE/REACTION TIME (RT) STUDY

5.1 Chapter Overview

This chapter details the on-line, reaction time (RT) study which supplements the speech production study described in Chapter 4. The study uses sentence matching tasks, first adapted in second language acquisition (SLA) research by Bley-Vroman and Masterson (1989), to further test Pienemann's (1998) Procedural Skills Hypothesis. In general, in sentence matching tasks, subjects are exposed to two sentences appearing on a computer screen and required to determine whether or not the sentences are identical. Subjects' RTs then are used to determine certain aspects of their "processes underlying discriminations" (Egeth, 1966: 245), or their grammatical knowledge of a second language (L2). In this study, subjects' RTs are used to determine the *linguistic procedures* (Pienemann, 1998: 221) aspect in Vietnamese learners of EFL regarding the English formative -s. The same thirty-six Vietnamese learners of English who participated in the production study, and twelve native speakers of English of the same age groups (13-18), performed sentence matching tasks which focused on the same structures tested in the production study.

The next section, 5.2, provides an historical overview of research on RTs using sentence matching tasks, with particular emphasis on Clahsen and Hong's (1995) and Pienemann's (1998) studies as they are directly related to the present study. Section 5.3 addresses the aims and objectives of this study. The fourth section, 5.4, is devoted to the methodology used in the study and presents the design, design

implementation, data organisation and statistical methods. The fifth section, 5.5, concerns data analysis and results, followed by discussion of the findings of the study in section 5.6.

5.2 Research on RTs Using Matching Tasks: an Historical Overview

5.2.1 Pre Bley-Vroman and Masterson (1989)

Research on RTs using matching tasks or *same-different* judgments has a long history dating back to the late 60s and early 70s. In presenting subjects with two stimuli, either single- or multi-dimensional, and asking them to judge whether the two stimuli were the same or not, investigators such as Egeth (1966), Nickerson (1967), Bamber (1969) and Eichelman (1970), proposed a number of models showing how subjects might perform the task.

Egeth (1966) simultaneously presented his subjects with two single-dimension stimuli that were the same or different in either colour or shape or the tilt of an interior line, and found that his subjects' mean RTs of the *different* responses decreased as the number of *different* dimensions increased. Nickerson (1967) did a similar experiment by presenting his subjects with two single-dimension stimuli, which were the same or different in either colour or shape or size, and interchanging them between simultaneously and successively occurring. The results of his study not only confirmed Egeth's (1966) findings but also revealed that his subjects' responses to *same* stimuli were faster than those to *different* stimuli. Expanding Egeth's (1966) and Nickerson's (1967) experiments, Bamber (1969) presented his subjects with two consecutive rows of letters, and asked them to indicate whether the two were the same or different. From the resulting RTs, Bamber (1969: 169) suggested that his subjects resorted to "simultaneously two distinct processes for comparing stimuli", one for the stimuli that are *different*, and the other for stimuli that are the *same*. Eichelman's (1970) experiment also showed

that differences in size, or case, of the letters stimuli, and non-word stimuli, lengthened subjects' RTs.

Analysing his results, Egeth (1966) proposed a number of possible *processing* models which subjects might use in performing the matching task. These processing models were said to reflect subjects' "mental act" (Bamber, 1969: 169) in comparing two stimuli, either single or multi-dimensional, and deciding whether the two are the same or different. Following Egeth (1966), Bamber (1969) suggested that, as stimuli can be multi-dimensional, subjects must have possessed different processing models to perform the task. For example if the stimuli included more than one dimension (colour, case, etc.) then Bamber's question was whether subjects processed these dimensions one at a time (serially) or all at the same time (parallel). He went on to suggest that within each of these two models, there were two sub-models generated depending on whether stimuli are the same or different. In deciding if the two stimuli are the same, subjects must process all dimensions before coming to the conclusion - hence the term *exhaustive* processing. In the case of two different stimuli, subjects might either stop processing as soon as they find the difference - a *self-terminating* process, or continue to process all dimensions before making the decision - again an 'exhaustive' process.

Following Eichelman (1970), Chambers and Forster (1975) did experiments on native speakers of English and found that subjects' RTs to letters, letter strings and words showed a multi-level of "identification and comparison" operating "simultaneously in the matching task" (Chambers and Forster, 1975: 549). It is Chambers and Forster's (1975) "multi-level race model" (Freedman and Forster, 1985: 103) that sparked its adaptation to word strings and sentence matching tasks which have since been widely used to test various processing effects.

Among the first researchers who extended matching tasks from the lexical to the sentential level were Freedman and Forster (1985). In their six successive experiments, also on native speakers of English, Freedman and Forster (1985) found that sentence matching tasks were particularly *sensitive* to certain grammatical or well-formed sentences. This *grammaticality effect*, as interpreted by Freedman and Forster (1985), was further explored by other researchers.

5.2.2 Sentence Matching Tasks in Second Language Acquisition (SLA)

5.2.2.1 Bley-Vroman and Masterson (1989)

Bley-Vroman and Masterson (1989) marked the beginning of utilising on-line RTs in sentence matching tasks on L2 learners. As proponents of Chomsky's (1965) Universal Grammar (UG), these two researchers followed Freedman and Forster (1985) in setting out this methodology to "probe" the "internal grammatical system" (Bley-Vroman and Masterson, 1989: 207) of the learners. They believed it was this system that enabled learners to recognise, acquire and produce grammatical sentences. Their methodology has been adopted and modified in many subsequent SLA studies.

5.2.2.2 Eubank (1993)

Eubank (1993) utilised the computer program written by Bley-Vroman and Masterson (1989) in sentence matching experiments on German native speakers and English speakers learning German as a second language (GSL). The purpose of Eubank's experiments was to test Clahsen's (1984) prediction of the processing strategies, the Initialisation/Finalisation Strategy (IFS) that GSL learners used in their acquisition of German word order. In particular, Clahsen (1984) predicted that GSL learners would take less time to process German uninverted ADV-SVO sentences than inverted ADV-VSO ones although the former are ungrammatical. The results of Eubank's (1993: 253) experiments showed that GSL learners used

"significantly shorter response times" with inverted sentences than with uninverted ones, thus contradicting Clahsen's (1984) IFS prediction. Further experiments in Eubank's study also indicated that "native speakers do not respond ... to the inverted-uninverted contrast", which prompted Eubank's proposed explanation that "natives and non-natives may process sentences in the SM [sentence matching] task in rather different ways." (Eubank 1993: 253)

5.2.2.3 Clahsen and Hong (1995)

Clahsen and Hong (1995) also adopted Bley-Vroman and Masterson's (1989) computer program in their two experiments to test Vainikka and Young-Scholten's (1994) claim that adult L2 learners were able to access UG parameters in the same way as child first language learners did. In light of evidence from German first language (GFL) acquisition that there were developmental correlations, or *clustering effects*, between two linguistic structures subject-verb agreement and null subjects, Clahsen and Hong (1995) used RTs experiments to investigate if this phenomenon could also be observed in adult GSL learners. Clahsen and Hong justified their choice of using RTs in sentence matching tasks by arguing that, if *grammaticality/ungrammaticality effects* in the above two structures could be found in adult GSL learners through their RTs in sentence matching tasks, then Vainikka and Young-Scholten's claim would be further empirically supported.

The main materials used in Clahsen and Hong's (1995: 72-73) experiments were grammatical and ungrammatical German sentences which contain violations of subject-verb agreement and the null-subject property, the rest were filler items which were used to make sure that the subjects were in fact performing the task accurately. In their first experiment, Clahsen and Hong had twenty native speakers of German (fourteen females and six males) perform the task. In the second experiment, thirty-three adult Korean learners of German (sixteen females

and seventeen males) were asked to do the same task. All subjects had to examine and decide as quickly and accurately as possible whether two sentences appearing on the computer screen were the same or different.

The results from Clahsen and Hong's (1995: 74-75) first experiment with native speakers of German showed that there were significant grammaticality effects in both structures: "19 out of 20 subjects had shorter mean RTs to grammatical items than to ungrammatical ones." And the results from their second experiment with GSL learners showed that majority of learners, 18 out of 33 in the agreement structure and 26 out of 33 in the null-subject structure, had similar RTs as German native speakers, i.e. GSL learners also had shorter mean RTs to grammatical test items than to ungrammatical ones.

Further to these results, Clahsen and Hong (1995) found that the two linguistic structures were acquired separately in their GSL learners. Among their 33 learners, 13 had acquired both structures, 2 had not acquired any of the two structures, and 18 had acquired either of the two. Within this last group, 5 had acquired the subject-verb agreement structure and 13 the null-subject one. Even in those learners whose RTs were similar to native speakers, there were no clear developmental clustering effects. Clahsen and Hong (1995) concluded that there was no access to UG parameter resetting in L2 learners.

5.2.2.4 Pienemann (1998)

Modifying Bley-Vroman and Masterson's (1989) computer program and using Clahsen and Hong's (1995) materials in another experiment with German native speakers and GSL learners, Pienemann (1998) evidenced his *processing strategies* model in second language development. These strategies were featured in his Processability Theory (PT) as the Procedural Skills Hypothesis. The main

difference between Clahsen and Hong's and Pienemann's experiments is that in Clahsen and Hong's, as proponents of UG, the sentence matching technique was used to look for *"linguistic knowledge"*, whereas in Pienemann's it was used to study *"linguistic procedures"* (Pienemann, 1998: 221). Subjects' RTs in Pienemann's experiment were used to confirm PT's prediction that non-native speakers would have to gradually progress through *structural* stages of language development before reaching the native speakers status. Accordingly, in his experiment to test procedural skills of German subject-verb agreement, Pienemann used three groups of subjects: native speakers, advanced non-native speakers with the skill, and early non-native speakers without the skill. The latter two groups of participants were selected based on their oral production samples which were analysed and classified, according to PT's stages of acquisition, as "above Agreement and below Agreement" respectively (Pienemann, 1998: 225).

Results from Pienemann's experiment showed a significant difference in RTs for grammatical and ungrammatical German test sentences within the native speakers and advanced non-native speakers, but not in the early non-native speakers. Pienemann (1998: 228) concluded that as native speakers and advanced non-native speakers performed in a *similar* way, and as grammaticality effects showed only in these two groups, the Procedural Skill Hypothesis was empirically confirmed.

5.3 The Present Study

5.3.1 Aims and Objectives

Following Pienemann (1998) and supplementing the production study described in chapter 4, the present on-line study seeks to consolidate Pienemann's (1998) experimental results which were stated in PT's Procedural Skills Hypothesis. Readers might recall from the previous chapter that this hypothesis assumes "the task of acquiring a second language is based on the acquisition of the procedural

skills needed for the processing of the language", and these procedural skills or "procedural routines, once automated, are similar in native speakers and non-native speakers" (Pienemann, 1998: 215).

The procedural routines investigated in this study are those that were tested in the production study, namely the English word-final '-s'. This study aims at investigating whether the procedural routines needed to process the above-mentioned linguistic markers in sentence matching tasks are similar in native speakers and in Vietnamese learners of EFL, especially in those skilled learners who are assumed to have the pre-requisite procedural routines automated.

The objective of this study is to investigate if on-line experiments of this type can be used to further understand and determine learners' *linguistic procedures* (Pienemann, 1998: 221), the implications of which will be beneficial to language teaching.

5.3.2 Research Question and Null Hypotheses

To achieve these aims and objectives, the study seeks to answer the research question: Do Vietnamese learners of EFL/ESL, especially the skilled ones, perform similarly to native speakers in sentence matching tasks?

The specific null hypotheses for the above research question are:

1. Native speakers' results show no effects in either way, i.e. neither grammaticality nor ungrammaticality effects.
2. Vietnamese learners' results, especially those from skilled learners, show similar performance pattern as in native speakers.

Having set the research question and null hypotheses, in the next section, I will address the methodological issues of the present on-line study.

5.4 Methodology

5.4.1 Experimental Design

5.4.1.1 Study Type: Cross-Sectional versus Longitudinal

As documented in the production study, the data base on which the present study was built is a cross-sectional one. Readers are reminded here of the rationale for this decision, which has already been stated in the previous chapter, Chapter 4.

5.4.1.2 Subjects

The same thirty-six Vietnamese learners of EFL in the production study participated in this on-line study. And the same procedure for selecting the subjects was applied when it came to selecting native speakers as one of the experimental groups for this study. As secondary education in the ACT (Australian Capital Territory) splits into two distinct levels, high school and college, all government schools take on this format by having the two levels on two separate campuses. This is not the case with the private school system in Australia, where both levels are often combined on one campus. It is also a government's requirement that all research conducted at any of their schools have to have approval from the Territory Department of Education, whereas at private schools, approval from the school principals is all that is required. Considering the complex procedure of getting approval from the Territory Department of Education in Canberra, again I had to call upon acquaintances to gain access to one of the private schools, where I was able to have the intended number of native speakers, all on one campus. Thus, the Orana School was selected with twelve native speakers of English of the same age groups and grades - six females and six

males, from year seven to year twelve – who were asked to participate in the study.

The next issue to be discussed in the design step is the materials used for the experiment. Descriptions of these materials along with their situational constraints and distribution within the experiment are presented in the next section. Also mentioned in the next section is the computer software used to drive the experiment.

5.4.1.3 Materials

Materials used in this on-line study consisted of pairs of experimental sentences to be matched. These experimental sentences were designed and implemented to cater for the subjects of the study, and for the specific purposes of the study.

Subjects were presented with pairs of short sentences that appeared on a laptop computer screen with the time interval of 1000ms (reasons for choosing this time interval will be discussed in section 5.4.2 where the pilot test of the experiment is described). Subjects' task was to decide whether or not the two sentences were the same and respond as quickly and accurately as possible by pressing a pre-selected key.

5.4.1.3.1 Experimental Sentences

The main experimental test items used in the experiments were 80 matching grammatical and 80 matching ungrammatical English sentences (see Appendix G for full lists of these test sentences). The ungrammatical test sentences contained omitted markers of the lexical plural –s, phrasal plural –s, possessive –s, and third-person-singular –s. As these markers are obligatory, their omission renders the sentences ungrammatical. Following Clahsen and Hong (1995) and Pienemann

(1998), the ratio between matching grammatical and ungrammatical sentences was set at 1:1. The only difference between matching grammatical and matching ungrammatical sentences was in the tested features, for example,

For Lexical Plural-s:

(a) They like animals. (grammatical)

(b) They like *animal*. (ungrammatical)

For Phrasal Plural-s:

(a) We need five chairs. (grammatical)

(b) We need five *chair*. (ungrammatical)

For Possessive-s:

(a) I ride Kim's bike. (grammatical)

(b) I ride *Kim* bike. (ungrammatical)

For Third-person-singular-s:

(a) She drinks her milk. (grammatical)

(b) She *drink* her milk. (ungrammatical)

Also, following Clahsen and Hong's (1995) and Pienemann's (1998) experimental designs, non-matching grammatical/ungrammatical sentences and meaningless strings were used as fillers. The function of these filler items was to make sure that the subjects were performing the task accurately (Clahsen and Hong, 1995: 73). In the non-matching pairs, one word of the second sentence was replaced with a different one of similar length, for example,

(a) They open two doors.

(b) They open two books.

Like in Clahsen and Hong's (1995) and Pienemann's (1998) experiments, the ratio between matching and non-matching sentences in the present study were set at 3:1. Finally, as explained in the next section, to match the constraint of a minimum number of constituents in experimental sentences, all meaningless sentences contained only three words, for example, "*Egg full close*", "*Afternoon big do*", etc.

5.4.1.3.2 Constraints in Writing up Experimental Sentences

To meet the objective of the present on-line study, which is to investigate if on-line experiments of this type can be used to further understand and determine learners' *linguistic procedures*, detailed considerations were taken to make sure that <u>*all*</u> subjects had full access to the vocabulary used in the test sentences. Those considerations were:

a. The vocabulary used was that provided in the glossary for the year six Text book, *Tieng Anh 6* (English 6) (Nguyen, Nguyen, Than and Nguyen, 2002). This was to ensure that all early learners especially year seven subjects, had already had access to vocabulary items.

b. To make the sentences as simple as possible for the early learners, the maximum number of words in each experimental sentence was four, and the minimum number was three. This was the result of the minimum structural requirement for each test sentence, thus the lexical plural-s sentences would have the least number of constituents, i.e three (e.g. *I like animals.*), and the other three structures would have four (e.g. *We need five chairs; They throw Mary's apple, She drinks her milk*). This has put considerable restrictions on the design/composition the test sentences, especially as the amount of vocabulary was also very limited.

c. For the same reason as in (b) above, the English canonical order was used: Subject + Verb + Object. The subject was a pronoun (*I, He, She, We* and *They*), and the object was either a (bare) lexical plural noun (*books*) or a noun phrase (*two cars, Nam's shirt, his bike*).

d. Only transitive verbs and simple present tense were used in the sentences. This was to eliminate any complicated syntactic and semantic effects caused by other tenses and aspects such as past tense, progressive and perfect.

e. In each experimental sentence, only one grammatical feature, either lexical plural or phrasal plural or possessive-S or 3rd-person-singular-S, was tested.

f. In the test sentences with lexical plural -s (Appendix C, list A), phrasal plural -s (list B), and possessive -s (list C), only subject pronouns *I, We* and *They* were used. These subject pronouns used with simple present tense state certain facts that help make the sentences free-standing and fully understandable, e.g. *They need doctors.* The subject pronoun *You* was avoided as it requires a context where imperative mode is implied, e.g. *You need doctors!* By the same token, the subject pronouns *He, She* were avoided as they required 3rd-person-singular -s in verbs, which conflicts with constraint (e) above which allows only one structure to be tested in each experimental sentence.

g. In sentences with lexical plural –s, phrasal plural –s and possessive -s, the features tested had to be in the object position. If these features were in the subject position, they would require other more complicated vocabulary and syntactic constituents, for example *I like animals* versus *Animals are liked by me.*

h. In sentences with the tested feature third-person-singular -s, object noun phrases with possessive adjectives (*his* chair, *her* friend) were used in agreement with the third-person-singular subject pronouns (*he/she*). This was to avoid the use of plural nouns that may be required if used without articles (a, the), which again would conflict to constraint (e) above, for example "*She plays her game*" instead of "*She plays game<u>s</u>*".

i. Words used for the tested features plural and 3rd-person-singular -s should end with letters other than '*-e*', e.g. *toy<u>s</u>, drink<u>s</u>*. This was to make sure that only the -s morpheme was added, not *-es*, to mark plural or 3rd-person-singular -s, e.g. *apple* is avoided as its plural is *apple<u>s</u>* which can be perceived by early learners as similar to *sandwich* and *sandwiche<u>s</u>*.

j. Only five proper names (*Ben, Kim, John, Mary* and *Tom*) were chosen to be used repeatedly in possessive-s test sentences as these names were simple and easy for the learners to recognise.

The drafted experimental test sentences were checked by various native speakers of English for any possible ambiguity and/or misappropriate use of English due to the above constraints. Changes were then made accordingly.

5.4.1.3.3 Distribution of Experimental Sentences

To minimise possible fatigue effects in subjects due to intense concentration on the computer screen, the experiment was divided into four small sessions, each lasting about five minutes. In between these four on-line sessions were the three elicited task series used for the production study described in Chapter 4. Each of the four on-line sessions has 76 pairs of sentences, with the following distribution:

. Matching:

Grammatical: 20 (5 for each structure)

Ungrammatical: 20 (5 for each structure)

Meaningless: 15

. Non-matching:

Grammatical: 8 (2 for each structure)

Ungrammatical: 8 (2 for each structure)

Meaningless: 5

The number of test and filler sentences and their distribution were kept as close as possible to that of Clahsen and Hong (1995) and of Pienemann (1998) even though the present study has twice the number of tested structures and its subjects were at a much lower level of language proficiency. Figure 5.1 below summarises the similarities and differences between the present study and that of Clahsen and Hong (1995) and of Pienemann (1998).

5.4.1.3.4 Software

For this study, Presentation® software from Neurobehavioural Systems (www.neuro-bs.com) was used. Presentation® software is a precise stimulus delivery and experimental control software system for neuroscience. It was originally designed for behavioral and physiological experiments using fMRI, ERP, MEG, reaction times, and single neuron recording, but has had many add-on features that make it applicable to a wide range of applications such as the present study. Presentation® has been giving auditory, visual and multimodal stimuli with sub-millisecond temporal precision. An interpreted programming language, Presentation Control Language (PCL), was used to develop the experiment.

Figure 5.1: Differences and Similarities between the present study and that of Clahsen and Hong (1995) and of Pienemann (1998)

Author (year)	Participants						Target Language	Target Structure	Time Interval (msec)		Number of Sentences	Number of Words/ sentence	Number of Syllables/ word
	N	L1	L2	Age	Gender	Proficiency Level			Sentence1 → Sentence2	Sentence2 → Blank			
Clahsen & Hong (1995)	20	German		19-28	14 F 6 M	Native speakers	German	Subject-verb agreement; Null Subjects	??	??	36 test & 32 fillers	6-7	10-11
	33	Korean	German	22-35	16 F 17 M	In Germany 1 month to 16 years	German		??	??	24 test & 48 fillers	7	8-9
Pienemann (1998)	7	German		19-31	??	Native Speakers	German	Subject-verb agreement	360	??	36 test & 32 fillers	6-7	10-11
	7	English	German	19-31	??	Post- SV agreement							
	7	English	German	19-71	??	Pre- SV agreement							
Dao (2006)	12	English		13-18	6 F 6 M	Native speakers	English	Lexical-s, Phrasal-s, Possessives-s & 3rd-person singular-s	1000	1000	40 test & 36 fillers for each structure	3-4	Max 8
	36	Vietnamese	English	13-18	18 F 18 M	Early to Advanced							

5.4.2 Pilot Test the Experiment

Once the experiment was completely set up, an informal test was carried out with a few adolescent native speakers of English in Canberra. The purpose of this informal test was to determine the suitable time interval between the appearances of the two test sentences. The criteria for this judgement was that if native speakers found the time interval was too short for them to process the test sentences, then it would (most) certainly cause difficulty to the learners, the effect that would certainly be not beneficial for the purpose of the present study.

Accordingly, this time interval was slowly increased from that of 360 milliseconds in Pienemann's (1998) experiment to 1000 milliseconds, where feedbacks from the testers were positive.

A pilot test was then carried out with twelve ESL learners, six females and six males of the same age groups - 13 to 18 – at the Secondary Introductory English Centre in Dickson, Canberra. These learners were from different linguistic backgrounds, with only one from Vietnam. The purpose of this pilot test was to make sure the setup procedures and experiment would run smoothly and more importantly, to make sure the needed data would be collected. The positive results and feedback obtained from this test run facilitated the main experiment with formal Vietnamese learners in Ho Chi Minh City. The procedures conducted in this pilot test were closely followed in the main data collection in Vietnam.

5.4.3 Data Collection: Procedures

The data collection took place during class time and in one of the vacant rooms at the school where the subjects studied. This vacant room was either a typical classroom with teacher's desk, blackboard, students' tables and chairs, etc., or an unoccupied meeting room for teachers or for guests of the school, which also had a

lot of furniture in it. There were always the researcher and only one subject at a time in the room during the entire time of the test. Subjects were allocated one hour time slot each by their coordinating teacher to come to the test. This one hour time frame was for collecting data for both the oral production and the on-line studies.

5.4.3.1 Pre-Experiment

A vocabulary test sheet, listed in Appendix B, was given to subjects via their coordinating teacher at least one day before the test day. Subjects were asked to study all the vocabulary before coming to the test, and to make sure all the words used in the experiment were fully understood.

5.4.3.2 Experiment

On the test day, I worked with one subject at a time on a laptop computer. Subjects were provided with a detailed oral explanation of how the test worked, what their tasks would be, and a five-minute practice session was conducted to familiarize them with the RTs test. Subjects then had to do four RTs sessions, each lasting about five minutes. In between these four sessions were the three oral tasks series for the production study, each lasting about ten minutes. Figure 5.2 below outlines the timeframe of the whole data collection procedures.

Figure 5.2: Timeframe for Data collection Procedures

Admin	Practice	*RTSession1*	OralTask1	*RTSession2*	OralTask2	*RTSession3*	OralTask3	*RTSession4*
5mins	5mins	*5mins*	10mins	*5mins*	10mins	*5mins*	10mins	*5mins*

Total: 60 minutes

During the RTs sessions, each test item was displayed on the computer screen in one of four positions: top left, top right, lower left and lower right, for example, as

test items appeared sequentially in pairs, the first item of the first pair would occupy the top left position, the second item lower right, and the first item of the second pair would occupy the top right position, the second item lower left. This was done to avoid possible eyestrain for subjects if they had to stare at only one spot on the computer screen for a long period of time. Also an alert sound was used to replace Pienemann's (1998) "visual clue" before the appearance of each test sentence. This was designed to alleviate subjects' eyestrain as much as possible.

After being given the start signal by responding to the prompt 'Ready' on the computer screen, the first test sentence appeared - right after the alert sound - in the top left position of the screen, and remained there for 1000 milliseconds (or 1 second). After that time interval, this first sentence disappeared and the second sentence appeared in the lower right position of the computer screen, also with the alert sound. The second sentence would disappear after another 1000 milliseconds, and subjects were then given the third 1000 milliseconds for reaction. Thus, each such trial would take 3 seconds. Subjects' RTs were measured from the moment the second sentence appeared on the screen up to the subjects' response reaction. There were two control keys on the keyboard set up for this purpose, key 'N' for 'no match' and key 'M' for 'match'. If a key was pressed, being either 'N' or 'M' or any other, or no response was received within those 2000 milliseconds after the second sentence appeared, a feedback would be given on the computer screen. If subject's response was correct, a 'positive' feedback would appear, indicated by the sound "Tada", followed by the written message on the computer screen "You are right!" If subject's response was incorrect, then a 'negative' feedback appeared, indicated by the voice "No", followed by the written message "You are wrong!" And if there was no response after the third 1000 milliseconds, a 'disappointing' feedback would appear, indicated by a sound resembling that of a door shut, and the written message "You ran out of time!" By pressing the mouse button, the test

would continue to the next test item pair. No matter what the response was, the software would record all of the events' timing.

5.4.4 Data organisation

5.4.4.1 Data Storage

Recorded raw data after each experiment session was stored in a text file on the laptop computer, thus four files were stored for each subject. An example of such a text file is given in Appendix H.

After each experiment session, the text file was renamed after the subject's name for identification purpose, and these individual files were then combined and transferred onto a large Microsoft Access database of some 40,000 plus lines.

5.4.4.2 Exclusion of Unwanted/Invalid Records

To make the database simpler for analysis and storage purpose, only the records containing the recorded times between the second sentence's appearance and subjects' response, which was of key importance, were retained. All other records which contained the elapsed times either between the first and the second sentences or between the subject's response and the next test sentence pair, were removed from the database. Empty records or those with repeated information were also removed. These invalid records were caused by the sensitivity of the computer when subjects unknowingly pressed the button too hard or too long. As this type of mishap did not happen often, these invalid entries occupy an insignificant amount of records in comparison to the actual data.

5.4.4.3 Data Representation

After the exclusion of all unwanted and invalid entries/records, the data is presented as follows,

Figure 5.3: Data representation

ID	Exp	Name	Date	Trial	Event	Code	Time	TTime	Un-certainty	Sys-Duration	D-Un-certaint
2	1	AT	9/29/2003 11:31:06 AM	1	Picture	sentence2	290	10121	2	8605	4
3	1	AT	9/29/2003 11:31:06 AM	1	Response	3	8824	18655	2		
6	1	AT	9/29/2003 11:31:06 AM	2	Picture	sentence4	38589	10123	2	7086	4
7	1	AT	9/29/2003 11:31:06 AM	2	Response	2	45533	17067	2		

Where,

. '*ID*' is the original record number after unwanted records 1 and 4, 5 and 8 etc. are removed;

. '*Exp*' indicates the experiment session, valued from 1 to 4;

. '*Name*' is subject's identity;

. '*Date*' indicates the date and time when the experiment took place;

. '*Trial*' identifies each pair of test sentences, valued from 1 to 76;

. '*Event*' is the type of the event, 'Picture' stands for the appearance of the test sentences and 'Response' stands for subject's response by pressing of a button;

. '*Code*' is given to each test sentence and type of response for recognition and analysis purpose: '2' is for "non-matching" response, and '3' is for "matching" response;

. '*Time*' is the starting time of each event, relative to the starting time of the whole experiment session, in milliseconds with 1 decimal point, for example '290' should be read as "at 29.0 milliseconds", etc;

. '*TTime*' is the same as '*Time*' above except measured relative to the start of the trial the event is in;

. '***Uncertainty***' is the uncertainty time in the '***Time***' and '***TTime***' values. If an event has time *t* with uncertainty *td*, this means that the event occurred between time *t* and time *t* + *td*;

. '***SysDuration***' stands for '***Systems Duration***'. For picture stimuli, this is the duration of the picture, in this case the duration of the second test sentence.

. '***DUncertainty***' stands for '***Duration Uncertainty***', is the uncertainty in the time given for the duration of a picture stimulus.

Because of the 'Uncertainty' times created by the system, to get as accurately as possible subjects' RTs , the following format was used to calculate subjects' RTs:

RT = (TTime_Response + 0.5 * Uncertainty_Response) –
(TTime_Picture2 + 0.5 * Uncertainty_Picture2)

For example, if we take the first two records (ids 2 and 3) from the small data mapping presented above as an example, then we have subject AT's reaction time for the first test sentence pair calculated as follows:

AT's RT = (1865.5 + 0.5 * 0.2) – (1012.1 + 0.5 * 0.2)
= (1866 * 0.2) - (1012.6 * 0.2)
= 373.2 – 202.52
= 170.68 milliseconds (or 1.7 seconds)

5.4.5 Statistical Methods

Analysis of the data was done using the methods described in Dobson's (1990) Generalized Linear Models (GLMs) and McCulloch and Searle's (2001) Generalized Linear Mixed Models (GLMMs).

Taking into account whether the test item was answered correctly or not as the response, a binary generalized linear model was fitted with a complementary log-log link function.

The significance of results (the p-value) was tested with F-tests, Chi-square tests and Wald tests as appropriate, where the chi-square distribution for Wald tests is an asymptotic approximation (i.e. for large samples). Consequently, in some cases, this can make results appear more significant than they really are (see McCulloch and Searle, 2001), so results which are only just significant (i.e. $p = 0.05$) should be interpreted with caution. However, many of the results obtained in the present study are very highly significant ($p < 0.001$); and the standard errors are appropriate for interpretation of the predictions as summaries of the data rather than as forecasts of new observations.

Finally, the level of statistical significance is interpreted as follows:

. not significant:	p is greater than 0.05 ($p > 0.05$)
. significant :	p is less than or equal 0.05 ($p <= 0.05$)
. highly significant:	p is less than or equal 0.01 ($p <= 0.01$)
. very highly significant:	p is less than 0.001 ($p < 0.001$)

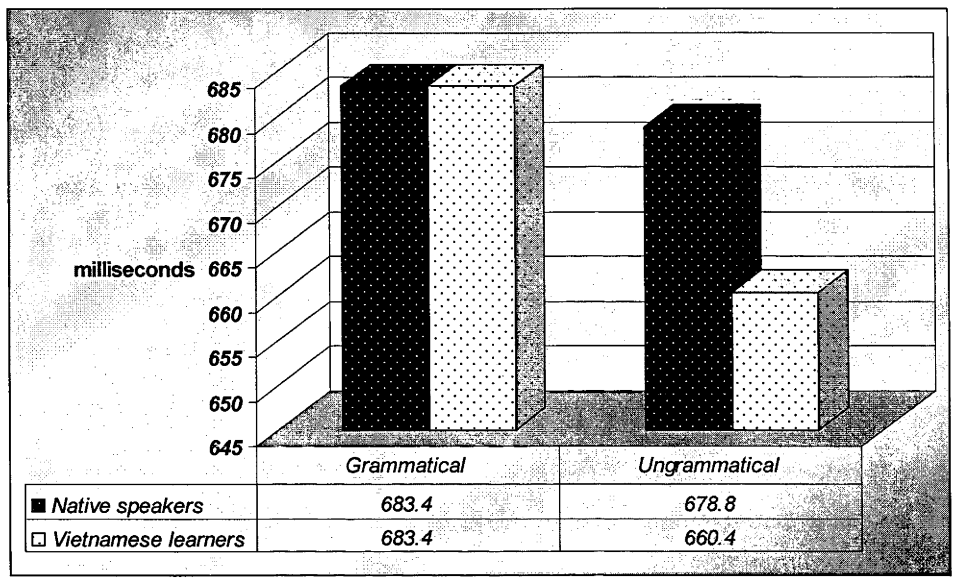
5.5 Data Analysis and Results

5.5.1 Overall results

Following Clahsen and Hong (1995) and Pienemann's (1998) methodology in analysing RTs, only correct responses from matching test items were analysed, and those items that received a wrong response were not taken into account as "other non-controlled factors might have been involved" (Clahsen and Hong, 1995: 72). The bar chart (figure 5.4) below shows the first look at the mean RTs in matching

grammatical and ungrammatical test items between native speakers and Vietnamese learners across all four tested structures:

Figure 5.4: Overall results for native speakers and Vietnamese learners



Interestingly, both native speakers and Vietnamese learners took exactly the same 683.4 milliseconds to correctly respond to matching grammatical test sentences. And both groups spent longer in correctly responding to matching grammatical sentences than to matching ungrammatical counterparts. In more detail, tables 5.1 and 5.2 below show the overall RTs within each group to matching grammatical and ungrammatical test sentences and the level of significance of the differences.

Table 5.1: Native speakers' (n = 12) overall mean RTs (in milliseconds) to matching grammatical and ungrammatical sentences.

G	UnG	S.e. Diff	Significance
683.4	678.8	5.76	$p = 0.431$ (> 0.05)

Conventions: G – Grammatical; UnG – Ungrammatical; S.e. Diff – Standard Errors of Differences

Table 5.2: Vietnamese learners' (n = 36) overall mean RTs (in milliseconds) to matching grammatical and ungrammatical sentences.

G	UnG	S.e. Diff	Significance
683.4	660.4	3.57	$p < 0.001$

Conventions: G – Grammatical; UnG – Ungrammatical; S.e. Diff – Standard Errors of Differences

Table 5.1 shows that, although there was the difference of 4.6 milliseconds shorter in native speakers group's response to **all** ungrammatical sentences, hence an *ungrammaticality effect*, the difference is not significant, $p > 0.05$. Thus, from this very first examination, it seems that Null Hypothesis 1 which states that there is neither grammaticality nor ungrammaticality effects shown in native speakers of English is supported. However, to be able to confirm Null Hypothesis 1 with confidence, further examination of this group's RTs in relation to other variables is also carried out. Prior to doing that, we next look at the RTs of Vietnamese learners. As can be seen in table 5.2, the difference in Vietnamese learners' overall mean RTs, the 23 milliseconds shorter response to ungrammatical test sentences is very highly significant, $p < 0.001$.

In case the overall results (tables 5.1 and 5.2) obscure the effects of individual grammatical structures, tables 5.3 and 5.4 below show the mean RTs in milliseconds between native speakers and Vietnamese learners in matching grammatical and ungrammatical test items in **each** of the four tested structures, Lexical Plural -s (LP-s), Phrasal Plural -s (PP-s), Possessive -s (PO-s), and 3rd-person-singular -s (3rd-s).

Table 5.3: Native speakers' (n = 12) mean RTs (in milliseconds) to matching grammatical and ungrammatical in each tested structure.

Structure	G	UnG	S.e. Diff	Significance
LP-s	638.1	634.2	11.51	p = 0.790 (> 0.05)
PP-s	697.5	685.8		
PO-s	703.3	707.9		
3rd-s	694.5	687.5		

Conventions: G – Grammatical; UnG – Ungrammatical; Diff – Difference; S.e. Diff – Standard Errors of Differences

Table 5.4: Vietnamese learners' (n = 36) mean RTs (in milliseconds) to matching grammatical and ungrammatical in each tested structure.

Structure	G	UnG	S.e. Diff	Significance
LP-s	627.6	600.3	7.13	p = 0.008 (< 0.01)
PP-s	715.6	687.5		
PO-s	707.7	673.5		
3rd-s	682.7	680.4		

Conventions: G – Grammatical; UnG – Ungrammatical; S.e. Diff – Standard Errors of Differences

These two tables expose an interesting picture: while Vietnamese learners highly significantly ($p < 0.01$) show a more consistent response to matching grammatical and ungrammatical test items of all four grammatical structures, the native speakers group reveals, although insignificant ($p > 0.05$), an inconsistent pattern where they took longer time to respond to the three matching grammatical and ungrammatical tested structures, lexical plural-s, phrasal plural-s and 3rd-person-singular –s but not the possessive –s structure.

Another noticeable observation is that both groups, native speakers and Vietnamese learners, took significantly less time in responding to lexical plural –s test sentences than to the other three structures; this holds for both grammatical and ungrammatical items. Tables 5.5 and 5.6 below show the significance of this trend:

Table 5.5: Native speakers' (n = 12) mean RTs in each tested structure

LP-s	PP-s	PO-s	3rd-s	S.e. Diff	Significance
636.2	691.7	705.6	691.0	8.14	$p < 0.001$

Conventions: LP-s - Lexical Plural –s; PP-s - Phrasal Plural –s; PO-s – Possessive –s; 3rd-s - 3rd-person-singular –s

Table 5.6: Vietnamese learners' (n = 36) mean RTs in each tested structure

LP-s	PP-s	PO-s	3rd-s	S.e. Diff	Significance
614.0	701.6	690.6	681.6	5.04	$p < 0.001$

Conventions: LP-s - Lexical Plural –s; PP-s - Phrasal Plural –s; PO-s – Possessive –s; 3rd-s - 3rd-person-singular –s

In summary, so far a ***first look at the overall results*** shows that

- there are *ungrammaticality effects* shown in native speakers although they are not statistically significant;
- the *ungrammaticality effects* in Vietnamese learners are statistically very highly significant;
- both native speakers and Vietnamese learners groups very highly significantly responded faster to lexical plural –s test sentences than to the other three structures.

The next step is to look further for possible effects on these results from other independent variables. These independent variables include subjects' gender and age, and subjects' accuracy rates in their responses.

Tables 5.7 and 5.8 provide the mean RTs in milliseconds of ***all*** females and males (native speakers ***and*** Vietnamese learners) in their correct responses to matching grammatical and ungrammatical test items in all four tested structures.

Table 5.7: All females' (n = 24) mean RTs to grammatical & ungrammatical test items in four tested structures

Structure	G	UnG	S.e. Diff	Significance
LP-s	614.5	593.6	5.9	p = 0.036 (< 0.05)
PP-s	685.0	677.3		
PO-s	679.6	652.8		
3rd-s	659.2	652.3		

Conventions: G – Grammatical; UnG – Ungrammatical; S.e. Diff – Standard Errors of Differences;
LP-s - Lexical Plural –s; PP-s - Phrasal Plural –s; PO-s – Possessive –s; 3rd-s - 3rd-person-singular –s

Table 5.8: All males' (n = 24) mean RTs to grammatical & ungrammatical test items in four tested structures

Structure	G	UnG	S.e. Diff	Significance
LP-s	577.7	554.4	5.5	p = 0.022 (< 0.05)
PP-s	637.1	620.8		
PO-s	629.3	609.1		
3rd-s	612.4	611.5		

Conventions: G – Grammatical; UnG – Ungrammatical; S.e. Diff – Standard Errors of Differences
LP-s - Lexical Plural –s; PP-s - Phrasal Plural –s; PO-s – Possessive –s; 3rd-s - 3rd-person-singular –s

Thus, by looking further into the relationship between subjects' RTs in separate structures and their gender, the results from the above two tables 5.7 and 5.8 (both having $p < 0.05$) show that **in relation to gender,** there are **statistically significant *ungrammaticality effects*** in this test study, i.e., all subjects significantly responded faster to ungrammatical sentence pairs than to grammatical ones, no matter who the subjects were, native speakers or learners, males or females.

Another observation from these two tables is that *male subjects responded faster than their female counterparts*. This is confirmed in tables 5.9 and 5.10 below where the significance level is very highly ($p < 0.001$).

Table 5.9: Significance of RT difference between males and females (Grammatical vs Ungrammatical)

Gender	G	UnG	S.e. Diff	Significance
Females	659.6	644.0	2.83	$p < 0.001$
Males	614.1	598.9		

Conventions: G – Grammatical; UnG – Ungrammatical; S.e. Diff – Standard Errors of Differences

Table 5.10: Significance of RT difference between males and females (among four structures)

Gender	LP-s	PP-s	PO-s	3rd-s	S.e. Diff	Significance
Females	604.0	681.1	666.2	655.7	2.82	$p < 0.001$
Males	566.0	628.9	619.2	611.9		

Conventions: S.e. Diff – Standard Errors of Differences;
LP-s - Lexical Plural –s; PP-s - Phrasal Plural –s; PO-s – Possessive –s; 3rd-s - 3rd-person-singular –s

The next two tables, tables 5.11 and 5.12, look at the other independent variable, age, and provide the mean RTs in milliseconds of ***all*** females and males from year 7 to year 12 in their correct responses to matching grammatical and ungrammatical test items. Note that in these two tables (and also in the next two), the standard errors of difference are large because the degree of freedom (i.e. the number of comparisons) in these tables is larger.

Table 5.11: Year 7-12 females' (n = 24) mean RTs to grammatical & ungrammatical test items

	G	UnG	S.e Diff	Significance
Year7	668.9	662.8	688.0	$p < 0.001$
Year8	633.2	625.8		
Year9	646.9	632.4		
Year10	643.1	622.3		
Year11	711.3	685.3		
Year12	654.0	635.6		

Conventions: G – Grammatical; UnG – Ungrammatical; S.e. Diff – Standard Errors of Differences

Table 5.12: Year 7-12 males' mean RTs to grammatical & ungrammatical test items

	G	UnG	S.e Diff	Significance
Year7	733.3	724.0	399.1	$p = 0.003$ (< 0.01)
Year8	566.6	559.6		
Year9	586.8	572.0		
Year10	593.5	581.6		
Year11	591.1	575.8		
Year12	613.6	580.7		

Conventions: G – Grammatical; UnG – Ungrammatical; S.e. Diff – Standard Errors of Differences

In relation to age, both genders reveal from a *highly* ($p < 0.01$) to *very highly* ($p < 0.001$) *significantly shorter time in their response to grammatical and ungrammatical test sentences as they get older.*

Finally, within the gender and age categories, tables 5.13 and 5.14 look at the relationship between subjects' ages, gender and their responses to individual grammatical structures. These two tables provide the mean RTs in milliseconds of ***all*** females and males from year 7 to year 12 in their correct responses to matching grammatical and ungrammatical test items in four tested structures.

Table 5.13: Year 7-12 females' mean RTs in four tested structures

	LP-s	PP-s	PO-s	3rd-s	S.e Diff	Significance
Year7	643.5	668.3	686.6	665.1	683.0	$p < 0.001$
Year8	588.7	630.0	663.3	636.0		
Year9	588.9	654.3	664.0	651.3		
Year10	571.2	653.5	670.6	635.6		
Year11	625.0	729.1	740.1	698.9		
Year12	607.1	662.0	662.5	647.6		

Conventions: LP-s - Lexical Plural –s; PP-s - Phrasal Plural –s; PO-s – Possessive –s; 3rd-s - 3rd-person-singular –s

Table 5.14: Year 7-12 males' mean RTs in four tested structures

	LP-s	PP-s	PO-s	3rd-s	S.e Diff	Significance
Year7	678.6	738.1	761.1	736.9	398.9	$p = 0.002$ (< 0.01)
Year8	536.4	570.6	571.0	574.3		
Year9	552.0	582.2	602.4	581.0		
Year10	547.2	612.9	606.1	584.1		
Year11	525.4	600.1	613.0	595.2		
Year12	556.8	611.2	620.1	600.4		

Conventions: LP-s - Lexical Plural –s; PP-s - Phrasal Plural –s; PO-s – Possessive –s; 3rd-s - 3rd-person-singular –s

These two tables, 5.13 and 5.14, summarise tables 5.7 to 5.12 above, and provide an overview obtained from examining the independent variables of gender and age. This overview shows that,

- all subjects took from a *highly* ($p < 0.01$) to *very highly* ($p < 0.001$) significantly less time to respond to all four structures as they get older; and
- males subjects showed a more consistent pattern and faster RTs than their females counterparts.

The last criterion to be looked at in the overall results is subjects' percentage of correct responses. Despite having found thus far no significant difference in RTs between native speakers and Vietnamese learners, it is argued that subjects'

percentage of correct responses should be observed prior to any final conclusion. Table 5.15 below shows the percentage of subjects who scored the most numbers of correct answers in matching grammatical and ungrammatical sentence pairs.

Table 5.15 Most correct answers in matching grammatical and ungrammatical sentence pairs achieved by each group

	Highest scores (all 80 items right)	
	Grammatical	Ungrammatical
NS(n=12)	17%	25%
NNS(n=36)	17%	19%

Conventions: NS – Native Speakers; NNS – Non-native Speakers

Lastly, table 5.16 below shows how the fastest and the slowest subjects in both groups performed in terms of their RTs and correct responses. It is worthwhile mentioning here that both the slowest responding native speaker and the slowest responding Vietnamese learner were in year 7 at the time of the experiment.

Table 5.16: Performance of fastest and slowest native speakers and learners

	Slowest		Fastest	
	Grammatical	Ungrammatical	Grammatical	Ungrammatical
Native Speaker	972.3 ms	974.4 ms	444.2 ms	426.4 ms
	77 correct	79 correct	78 correct	77 correct
Vietnamese Learner	860.2 ms	900.2 ms	499.6 ms	483.0 ms
	77 correct	74 correct	75 correct	76 correct

As we can see, individually, there is still a similar pattern of performance between native speakers and Vietnamese learners; and within each subject, there is a strong consistency in his/her own performance across both test categories. Appendix I shows this observation by presenting individual subject's RTs, the reaction time difference between grammatical and ungrammatical, and number of correct

responses, appendix Ia for English native speakers (n=12), and appendix Ib for Vietnamese learners (n=36).

Following Pienemann's (1998) experimental design of three experimental groups, and based on the results of the speech production study (Chapter 4), the next section will look at the RTs of those Vietnamese learners who have acquired the 3rd-person-singular-s and were considered as skilled learners at the time of the experiment, and compare their performance with those of the non-skilled and of the native speakers groups.

5.5.2 Verbal Morphology: 3rd-person singular –s

Readers might recall that, with respect to the 3rd-person-singular –s, results from the present speech production study lend a strong support towards Processability Theory with two distinctive groups of learners, the first group consists of four Vietnamese learners who have acquired the structure and the second group of thirty-two learners who have not. From this point onwards, the term *skilled learners* will be used to refer to the first group of learners, and the term *unskilled learners* to the second group of thirty-two learners. In this section, we first look at the four skilled learners' on-line performance as a group and then as individuals.

5.5.2.1 Group Results

Table 5.17 below shows the mean RTs for correct responses to matching and non-matching grammatical and ungrammatical test sentences among the three groups: skilled, unskilled learners and native speakers. The results show that there is no statistically significant difference in the RTs among these three groups ($p > 0.05$).

Table 5.17: Mean RTs for 3rd-person-singular-s among skilled, unskilled learners and native speakers

	G	UnG	S.e. Diff	Significance
Skilled learners (n=4)	683.7	647.8	37.24	p = 0.212
Unskilled learners (n=32)	683.1	661.8		
Native speakers (n=12)	683.4	678.8		

Conventions: G – Grammatical; UnG – Ungrammatical; S.e. Diff – Standard Errors of Differences

5.5.2.2 Individual Skilled Learners' Results

Individually, results from the performance of the four skilled learners show that

. there is no statistically significant performance difference among skilled learners ($p = 0.582 > 0.05$); and

. skilled learners also used very highly significantly ($p < 0.001$) shorter response times for matching *ungrammatical* test items than for matching grammatical ones. Table 5.18 below displays these figures.

Table 5.18: Individual skilled Vietnamese learners' mean RTs

Subject	G	UnG
HAu	641.3	581.4
HD	717.4	691.1
ThTr	530.5	506.1
VA	845.7	812.7

Conventions: G – Grammatical; UnG – Ungrammatical; S.e. Diff – Standard Errors of Differences

. difference among learners: S.e. Diff: 63; Significance: $p = 0.582$

. difference between G and UnG responses: S.e. Diff : 10.19; Significance: $p < 0.001$

This latest analysis justifies the overall results that there was no statistically significant performance difference between native speakers and Vietnamese learners as there was no difference from the performance pattern of these skilled, unskilled learners and native speakers.

5.5.3 Results Summary

The above exhaustive analysis of the RTs between native speakers and Vietnamese learners, and among native speakers and skilled and non-skilled learners in relation to the verbal morphology 3rd-person-singular-s, confirms the following observations,

- although the overall results do not show a level of statistical significance in native speakers' ungrammaticality effects, there is ***evidence of these effects in all analyses***, especially when analysis was taken in connection with those independent variables such as gender and age; and

- there are consistently, statistically significant ***ungrammaticality effects*** in Vietnamese learners, including those skilled ones, i.e. Vietnamese learners also responded faster to ungrammatical sentence pairs than to grammatical ones.

Accordingly, these results reject Null Hypotheses 1 and support Null Hypothesis 2 in that (1) native speakers do show an effect, i.e. *ungrammaticality effects*; and (2) Vietnamese learners, including the skilled ones, show *similar performance pattern* as in native speakers. Thus, the results of the present study do not support PT's Procedural Skill Hypothesis which assumes ***similar grammaticality effects*** between native speakers and skilled learners (Pienemann, 1998: 215). Furthermore, the results of the present study also indicate that

- male subjects responded faster than female subjects;
- both genders responded faster as they get older; and
- both native speakers and learners, and both genders responded faster to lexical plural-s sentences than to the other three structures.

5.6 Discussion

To test Pienemann's (1998) Procedural Skills Hypothesis which assumes language processing procedures are similar in native speakers and in advanced or skilled L2 learners, this study conducted a RTs experiment, adapting that of Clahsen and Hong (1995) and Pienemann (1998). Subjects were in the 13 to 18 age groups, comprising of 12 native speakers and 36 Vietnamese learners of EFL among whom 4 were skilled.

The results from native speakers and skilled Vietnamese learners do not support Pienemann's (1998) experimental study, and his Procedural Skill Hypothesis. However, the results were not random: there was indeed an *effect*. This effect was the reverse of the one predicted by Pienemann (1998), an *ungrammaticality effect*, found in both native speakers and Vietnamese learners, especially in the learners group as their RTs were significantly shorter in relation to ungrammatical sentences than to grammatical ones. These findings raise some questions that need to be answered and explained:

1. Why do the results of the present study divert from those of Clahsen and Hong's (1995) and of Pienemann's (1998) studies?

2. Is sentence matching task a reliable experimental device for testing learners' second language knowledge or, in this case, their procedural skills?

3. Why are there *ungrammaticality effects* in native speakers and in Vietnamese learners?

While answers to the first and second questions will concern the study's objective (to investigate if on-line experiments of this type can be used to further understand and determine learners' linguistic procedures), answers to the third question will, indirectly, address the aim of the present study (to investigate if the procedural routines, once automated, are the same in native speakers and in Vietnamese learners of EFL).

For the first question, why the results of the present study divert from those of Clahsen and Hong's (1995) and of Pienemann's (1998), the explanation may lie in the language specific factor. The fact that German was used in Clahsen and Hong's (1995) and Pienemann's (1998) studies and English in the present study has raised the question as to whether there are certain properties of English that bring about the different results. Nicol, Teller and Greth's (2001) work and report on the production of subject-verb agreement in English natives speaking Spanish and Spanish-English bilinguals speaking English, may give an answer to this question.

Prior to Nicol et al.'s (2001) study, there was experimental evidence from various studies from 1991 to 1999 (Bock and Miller, 1991; Bock, Eberhard and Cutting, 1992; Bock and Eberhard, 1993; Vigliocco, Butterworth and Semenza, 1995; Vigliocco, Hartsuiker, Jarema and Kolk, 1996; Vigliocco, Butterworth and Garrett, 1996; Nicol, Forster and Veres, 1997; and Bock, Nicol and Cutting, 1999) suggesting that there are distinct differences in the implementation of subject-verb or subject-pronoun agreement between English speakers and speakers of other languages such as Spanish, Italian, French and Dutch. The differences were found through successive experiments in which subject-verb or subject-pronoun agreement errors were induced. The common technique that these authors used in their experiments was to present their subjects with sentence fragments (or preambles), such as

(a) The key to the cabinets …,

(b) The address on the envelopes …,

where a prepositional phrase ('to the cabinet', 'on the envelopes') followed and modified its respective head noun ('The key', 'The address'). In the case of preamble (b), although the head noun 'address' is singular, the fragment is considered to be *conceptually plural* because there is one address and the same address is seen on each envelope. That is "an example of a *multiple token* of a particular type; the multiple token interpretation of a phrase is often referred to as the *distributive* interpretation" (Nicol et al. 2001: 118). However, preamble (a) is said to be both *grammatically* and *conceptually* singular, as there can be one key that can open a few cabinets. Subjects were then asked to repeat the fragment and complete the sentences with either a verb or a tag question, for example,

(c) The address on the envelopes fade/*fades.

(d) The key to the cabinets vanished, didn't it/*they?").

Results from these experiments showed that a *distributivity effect* (Nicol et al., 2001) existed in native speakers of Spanish, Italian, Dutch and French, but not in native speakers of English. This distributivity effect occurred where participants successfully interpreted multiple tokens of a type, and correctly implemented subject-verb or pronoun agreement. English speaking subjects' induced errors were higher when the head noun ('address', 'key') was singular and the non-head modifier ('envelopes', 'cabinets') was plural, especially in cases of subject-pronoun agreement such as preamble (d) where a pronoun was required. What makes English so different? These authors argued that

> "English stands apart from the other languages in a number of respects. One difference is that the other languages exhibit much richer agreement: more lexical categories enter into agreement, including articles, verbs and adjectives, and may need to agree along a greater number of dimensions." (Nicol et al., 2001: 121)

Because of this richness, native speakers of these languages (especially of those that allow sentences without a subject (pro-drop) and sentences in which the verb can appear before the subject (subject-verb inversion) such as Italian and Spanish) resort to *conceptual* interpretation to produce agreement; whereas, English speakers, when producing sentences, compute subject-verb or pronoun agreement *grammatically* or *syntactically*, rather than *conceptually*.

In their study, Nicol et al. (2001) examined *distributivity effects* in second language learners and bilinguals. They conducted two experiments with University students, one with English speakers learning Spanish at an upper level, and one with early Spanish-English bilinguals speaking English. Results from Nicol et al.'s (2001: 127) first experiment with English natives speaking Spanish showed that most of these English speakers did not exhibit the distributivity effect in Spanish, although a subset did show the effect. And results from the second experiment showed that bilingual speakers did exhibit a strong distributivity effect in English. Nicol et al. (2001: 131) concluded that "if speakers do conceptually mediate verb agreement some of the time, they will do it all of the time".

It is the findings of the differences in computing subject-verb or pronoun agreement between English speakers and speakers of other languages like Spanish that relates to the different results between the present study and those of Clahsen and Hong (1995) and Pienemann (1998). Clahsen and Hong, and Pienemann

looked at certain linguistic structures in German, a language that is also richly marked, which, according to Nicol et al. (2001: 130), encourages "conceptually mediated subject-predicate agreement". With respect to the head noun of a noun phrase (NP) in German, the determiner has to agree phrasally with it in number and gender, the verb has to agree interphrasally with it in number and person, and the adjective has to agree phrasally with it in number and gender; moreover, German also has subject-verb inversion feature as in Spanish.

It is therefore possible that, having either to compute this *conceptually mediated* agreement or to go through the complexities of German morphology (form-function mappings) in practice, such as in the on-line RTs experiments, would result in a longer RT in German native speaker participants. Putting aside, for the moment, the differences in the length of the test sentences and in the designed time (depicted in figure 5.1) allowed for subjects to respond in each study, the following figure summarises the mean RTs (in milliseconds) of native speakers of German and English to their corresponding language's subject-verb agreement in the studies of Clahsen and Hong (1995), Pienemann (1998) and the present study:

Figure 5.5: Resulted Mean RTs between the present study and others

Study (Year)	Natives	Grammatical	Ungrammatical	Difference
Clahsen & Hong (1995)	German	1674	1953	+279
Pienemann (1998)	German	1277	1506	+229
Dao (2007)	English	694.5	687.5	-7

Even though further experimental study is needed to confirm the suggestion of a conceptual or syntactic computation, it would be appropriate here to consider a related issue as possible cause of the differences in subjects' matching times in at least these three experimental studies. Subjects' matching time differences have been examined in various studies, and it has been suggested by Crain and Fodor

(1987: 169) that "the matching task is sensitive to a number of different properties of sentences". Murray (1982) showed that matching tasks are sensitive to meaningless word strings and sentences with *gross* deviation from grammaticality. Freedman and Forster's (1985) experiments 3 and 4 in particular, are of particular interests to this issue.

In experiment 3, Freedman and Forster (1985) presented their subjects with three conditions: (a) fully grammatical sentences, (b) the phrase structures of these grammatical sentences were then reversed, and (c) word scramble strings, such as the followings:

(a) The guest introduced his wife politely.
(b) *His wife politely the guest introduced.
(c) Before sick called home Mike.

Statistically significant results showed that, compared with the fully grammatical sentences, subjects took 125 milliseconds longer in matching time with phrase scramble sentences, and another 223 milliseconds more with word scramble strings. The error rates also increased, with grammatical 5.3%, phrase-structure scramble 7.4%, and word scramble 10.9%.

In their fourth experiment, Freedman and Forster (1985) considered cases of sentences where there was minor ungrammaticality, such as violations of subject-verb agreement rule, and wrong placement of quantifier in the following ungrammatical sentences:

(d) *Mary were writing a letter to her husband.
(e) *The baby ate his cereal up all.

Results from this experiment showed that subjects required statistically significant 42 milliseconds longer in response to ungrammatical agreement sentences, and 66 milliseconds to misplaced quantifiers sentences.

The argument that the present study would like to adopt is based on Freedman and Forster's (1985) findings of the above-mentioned experiments, where their subjects spent significantly longer matching time for grammatical and ungrammatical sentences in experiment three than in experiment four when minor ungrammaticality was induced. If Freedman and Forster's (1985) agreement violations and wrong placement of quantifiers in experiment four were seen as minor departure from ungrammaticality, then those linguistic structures tested in the present study (namely lexical, phrasal and verbal morphology agreement violations) should belong to the same category. This may explain further the significantly short mean RTs in subjects of the present study compared with others as presented in figure 5.5 above.

At this point, readers then might ask, but all three studies, those of Clahsen and Hong (1995), Pienemann (1998) and the present also involved subject-verb agreement which was considered by Freedman and Forster (1985) as minor departure from ungrammaticality, why is there the difference between the first two and the present one?

The answer to this question still relates to the issue of sensitivity of matching tasks to a number of different properties of sentences, such as the difference in the length of the test sentences between this study and the others. Figure 5.6 below is taken from the big picture depicted in figure 5.1 to demonstrate this difference.

Figure 5.6: Differences in test items' length between the present study and others

Study (Year)	Target Language	Test items' length
Clahsen & Hong (1995)	German	7 words (8-9 syllables each)
Pienemann (1998)	German	7 words (8-9 syllables each)
Dao (2006)	English	3-4 words (max 8 syllables)

As explained earlier in the methodology section, one of the essential requirements in designing the materials for the present study was that the test sentences had to be as simple as possible in order to cater for the very early learners. All of the linguistic structures, from words to phrases and sentences, were carefully selected for that purpose. One may expect meaningless results, if those learners were unable to understand and process the materials presented. The fact that all subjects responded faster to the short lexical plural-s sentences than to others was a related answer to this issue. This could possibly be due to constraint (b) described in section 5.4.1.3.2 above, where lexical plural –s test sentences have the least number of words compared to the other three structures: three in comparison to four. If that was the case then, remotely and indirectly, this result has attributed to that of Eichelman's (1970): differences in length of stimuli lengthened subjects' RTs [10].

Therefore, the long and complicated test sentences such as those used in Clahsen and Hong's (1995) study, and reused in Pienemann's (1998), were possibly an advantage, in the sense that they, the test sentences, were able to 'discriminate' between native speakers and learners, and between skilled and non-skilled learners. However, to be capable of coping with such a test, their subjects were much older and/or more mature and, importantly, more advanced in the target/second language.

[10] See section 5.2 for details of Eichelman's experiment and its results.

We now turn to the second question on the validity of sentence matching tasks. Even though the results of the present study clearly contradict those of other studies, one may also say, in the best-possible-case scenario, that its findings are inconclusive. No matter which feedback this study receives, a more important question remains, can we test PT's processing assumptions – that "the task of acquiring a second language is based on the acquisition of the procedural skills needed for the processing of the language," and that these "procedural routines, once automated, are similar in native speakers and non-native speakers" (Pienemann, 1998:215) – by using sentence matching tasks?

Many researchers have turned to sentence matching tasks as a way to determine L2 grammaticality (Bley-Vroman and Masterson, 1989; Eubank, 1993; Clahsen and Hong, 1995; Slabakova, 1997; Duffield, Prevost and White, 1997; Duffield, Monrul, Bruhn de Garavito and White, 1998; Beck, 1998; Duffield and White, 1999), among whom Duffield et al. (1998: 151) maintain the advantage of sentence matching tasks in that the task "allows us to elicit implicit grammaticality judgments from subjects". In the present study, sentence matching tasks are used to measure subjects' *procedural skills*, the skills to apply grammatical rules, in this case, required to match sentences. However, the similarity of the results of the native speakers, skilled and unskilled Vietnamese learners in this study suggests that something other than *procedural skills* may be taking place. It is therefore suggested that, most likely due to the shortness and simplicity constraints on the test sentences, all subjects of this study were allowed for a word-by-word matching rather than being required to undertake any kind of processing.

For the last question, why there are *ungrammaticality* effects in native speakers, and in Vietnamese learners, a number of explanatory proposals in language theories as well as in SLA research studies can be resorted to. The most applicable explanation

that I would like to adopt is from Levelt et al.'s (1999) Theory of Lexical Access in Speech Production [11].

Since Processability Theory incorporates Levelt's (1989) Theory of Speech Production [12], the present results may be explained in terms of Levelt et al.'s (1999) extended model of lexical selection, in particular, the model of accessing morphologically complex words.

In their unpublished RT study, Baayen, Levelt and Haveman (cited in Levelt et al., 1999) presented their participants with pictures of one or two identical objects. Participants were asked to name the objects, using singular or plural accordingly. The presented objects were of two types. The first type was called *singular dominants* whose singular forms were more frequently used than their plural forms. An example of this type is the word *nose* which is more frequently used than its plural *noses*. The second type was called *plural dominants* whose, in reverse, plural forms were more frequently used than their singular forms. An example of this type is the word *eyes*, which is more frequently used than its singular *eye*.

The results of Baayen et al.'s experiment showed that (i) participants spent a small but significant longer time in responding to plurals than to singulars, and that (ii) both plural dominant singulars (*eye*) and plural dominant plurals (*eyes*) caused significantly longer response time than singular dominant singulars (*nose*) and singular dominant plurals (*noses*), with "relatively high-frequency plural dominant plurals [e.g. *eyes*] had the longest naming latencies" (Levelt et al., 1999: 13).

---

[11] This theory was used in chapter 4, Discussion section, to explain the results of the speech production study.

[12] See chapter 2, section 2.3.3.2, for more details on Levelt's (1989) Theory of Speech Production.

The first result (i), Levelt (1999) explained, was possibly due to the fact that in order to generate the plural *noses*, a speaker has to have access to two separate lexical concepts: NOSE and MULTIPLE. These two lexical concepts then select the lemma *nose* with the diacritic feature *plural*, which in turn activate two morpheme nodes <nose> and <-əz>. This process is certainly more complex and therefore takes longer time than the process of generating the singular nose.

For the second result (ii), Levelt (1999) continued, the plural dominants such as *eyes* probably have two different specific lexical concepts: *eye* and *eyes* (the latter with already-attached diacritic plural feature). The process of generating the plural *eyes* is similar to that of generating the plural *noses* described above. In addition to this long process of generating plural *eyes* is the selection competition between the two specific lexical concepts *eye* and *eyes* since semantically they are highly related. Consequently, both lemmas *eye* and *eyes* are activated when needed and only one can be selected. This explains the longer response times for both plural dominant singulars (*eye*) and plural dominant plurals (*eyes*) than for *nose* because *nose* has no such a competitor.

In this study, subjects' reading of *grammatical* test sentences might be said to involve access to morphological complex words involving the plural-s, possessive-s and 3rd-person-singular-s. And, as explained in the Discussion of Chapter 4, since in the initial state, the learners' mental lexicon do not comprise these complex morphemes –s, and since *ungrammatical* test sentences have these complex morphemes omitted, the learners do not experience any activating competition in their selection processes. Consequently, early learners had no selection dilemma in responding to these ungrammatical sentences, resulting in shorter RTs.

5.7 Conclusion and Directions for Future Research

Despite the 'reverse' results from this on-line study, it is argued that different properties of the language under investigation and of the test sentences within that particular language, might have contributed to the different results of the individual experiment. The findings of the present study, on the other hand, also bring out the fact that gender and age do make a difference in RT experiments involving language users and learners, the two variables that none of the SLA studies using sentence matching tasks (cited section 5.2.2) to measure subjects' linguistic knowledge or procedures, attempted to control.

With all of the pros and cons of sentence matching tasks and RTs studies presented in the present study and in the discussion, it is possibly appropriate to conclude by quoting Crain and Fodor (1987: 169) that the "multiple sensitivity of the sentence matching task would make it a useful research tool, if these various factors could always be kept distinct by judicious design of the materials." From the results of the present study, it is possible to add that, sentence matching tasks also require longer and more complex sentences for them to have an effect, and that it is not feasible if early learners are to be included in the study.

These concluding remarks lay emphasis on future research to consider the properties of the language used in sentence matching tasks, as this will lead to further considerations on various aspects of the methodological design, with controlling for sentence length and complexity being ones of the priorities.

In the next, and final, chapter, chapter 6, the main findings of this on-line study and those of the speech production study described in chapter 4 will be highlighted. Limitations of the two studies together with suggestions for future research, and implications for teaching will also be presented.

CHAPTER 6
CONCLUSION

6.1 The Thesis

This thesis has examined the processes and constraints experienced by Vietnamese learners of English as a foreign language in their acquisition of the English formative –s.

The thesis was built on the theoretical (PT) assumptions that (1) learners can only process/acquire the various functions (nominal and verbal markers) of the English formative –s stepwise, that is, the acquisition of the lexical –s is the processing prerequisite for the acquisition of the phrasal –s, which in turn is the processing prerequisite for the acquisition of the inter-phrasal 3rd-person-singular –s; and (2) these processing procedures, once automated, are similar in native speakers and in skilled or advanced learners, as a result, native speakers and skilled learners will exhibit 'grammaticality effects' in, for example, an on-line sentence matching task (Pienemann, 1998).

This thesis was also built on an (inconclusive) empirical assumption that, of the three morphemes, only the inter-phrasal 3rd-person-singular –s is a developmental feature, while the lexical and the phrasal –s (which includes the phrasal plural –s and the possessive –s) are variational features (Johnston, 1997).

6.2 The Studies

To investigate these assumptions, this thesis involved two different but related studies. The first study examined the speech production data of 36 Vietnamese formal learners of EFL, aged 13 to 18, collected through a series of communicative tasks which were designed for learners to elicit the four –s structures. The second

study, a supplement to the first, examined the reaction times performed by the same learners and by a control group of 12 native speakers of English of the same age group, through a series of sentence matching tasks involving the grammatical and ungrammatical tested structures. Both studies, production and on-line, were aimed at providing typological and empirical data on the processing procedures of the English formative –s as assumed above by PT and Johnston (1997).

Results of the production study lend strong support towards the developmental nature of the verbal morpheme 3rd-person-singualr –s, but not towards that of the three nominal morphemes –s. The found order for this group of nominal morphemes was phrasal > lexical > inter-phrasal, instead of lexical > phrasal > inter-phrasal as predicted by PT. Thus, results of the production study confirm both PT's and Johnston's (1997) assumptions in relation to the verbal morpheme –s, but contradict both authors' assumptions on the order and the variational nature of the three nominal morphemes.

Results of the on-line study indicate that, both native speakers and Vietnamese learners, including the skilled and non-skilled, do show similar effects, but reverse to the ones predicted, i.e. *ungrammaticality* rather than *grammaticality* effects, as they respond ***faster*** *to ungrammatical,* rather than grammatical, test sentences. Thus, the results of the on-line study do not support PT's Procedural Skill Hypothesis which assumes similar ***grammaticality*** effects between native speakers and skilled learners. Furthermore, the results of the on-line study also show that,

- male subjects responded faster than female subjects;
- both genders responded faster as they get older; and
- both native speakers and learners, and both genders responded faster to lexical plural-s sentences than to the other three structures.

Taking into account the facts that the number of studies on speech production and reaction times of EFL learners is not proportionate to that of ESL, and research on learners of EFL/ESL from language backgrounds other than Chinese and western languages is also limited, the two present studies, especially the production study, have contributed to the SLA literature in that they show that, *Vietnamese learners of EFL experience different processes and constraints in their path to acquire the English plural morpheme –s from those observed in learners from western language backgrounds.* It is argued that these processes and constraints are conditioned by the learners' L1 morphological system which employs a different linguistic means - the classifier - to express the notion of countability/plurality at the conceptual, lemma and form levels (Charters et al., forthcoming). It is also suggested that these different processes and constraints are further conditioned by the learners' L1 phonological system which does not allow the word-final consonant of [s] or [z] (Hansen, 2004), and which *possibly* favours the L1 prosodic structures (Goad et al., 2003; Goad and White, 2006).

In addition, compared with previous studies of acquisition of the English nominal morphology –s, especially within a PT framework, such as that of Johnston (1997), and with previous RTs studies such as those of Clahsen and Hong (1995) and Pienemann (1998), it is apparent that the present studies provide a richer, more complex and more descriptively adequate representation. This is due in part to the theoretical assumptions cited above in relation to the causes of different processes and constraints experienced by Vietnamese learners, and in part to the methodological measures that produce data density/robustness in the production study and control for gender and age in the on-line study.

6.3 Limitations of the Thesis and Agenda for Future Research

The present thesis has been limited to the cross-sectional study of the English formative –s in the speech production and reaction times of learners from only one L1 background. The question remains as to how far the findings of this thesis may be generalised to other linguistic structures and to the speech production of learners from other L1 backgrounds. Most research ultimately aims at being able to draw conclusions regarding the general process of second language acquisition independent of learners' L1, or of a particular L2, and of a particular linguistic structure under investigation. Therefore, no matter how thorough and convincing the explanations of the present results are, to be certain that what has been found here is a general phenomenon in SLA, further studies need to be carried out using a similar approach to that adopted by the present thesis.

In connection with the two present studies' limitations (cross-sectional) and strengths (data density/robustness of the production study and controlling/analysing for gender and age in the on-line study), this thesis engenders the following directions for future research, firstly, on learners' speech production:

- A longitudinal study with *non-instructed* participants from the same (Vietnamese) L1 background to ascertain the effects of instruction on learners' learning process as suggested by Pica (1983);

- A longitudinal study with *instructed* participants from a similar (classifier) and from a different L1 background to investigate the effects of L1 morphological transfer as suggested by Young (1991) and Charters et al. (forthcoming);

- A 'fine-grained analysis' of the phonological systems of classifier languages such as Vietnamese or Chinese, to confirm both Young's (1991) and Hansen's (2004) suggestions of a L1 transfer and Goad et al.'s (2003), Goad and White's (2006) hypothesis of a Prosodic Transfer;

- To investigate a not-yet explored area, that of a possible interaction/relationship between phonology and morphology in the acquisition of English by learners of classifier L1s;

- And, if this interaction/relationship is established, future research could then proceed further into other L1s.

Secondly, in relation to on-line sentence matching tasks, future research needs to consider the properties of the language to be used in these experiments, as decisions to be made on various aspects of the methodological design such as sentence length and complexity, will have to depend on these properties.

6.4 Implications for Teaching

Although future research is needed to establish the generalization of the linguistic variables (as opposed to gender and age) investigated in the two present studies beyond Vietnamese learners of English, the findings of the two present studies help provide important implications for the possible development of a suitable syllabus in teaching EFL/ESL, at least for learners of Vietnamese L1.

The most obvious implication is whether or not to follow the implicational order of, at least, the tested morphological features assumed by PT. If future research supports the results and order found by the present study, then teachers and syllabus designers should take into account the fact that L1 influence or transfer

effects may play an important role in the learners' learning process. And those influences/effects may exist both in the morphological and in the phonological domains (Young, 1991; Hawkins and Chan, 1997; Jiang, 2004; Bliss, 2006; Goad et al., 2003; Hansen, 2004; Goad and White, 2006). The finding of the present speech production study that the phrasal plural emerges before the lexical plural in Vietnamese learners argues against a purely notional organisation of curriculum materials and teaching objectives, at least as far as plurals are concerned. One of the strongest assumptions of the early emergence of the phrasal plural –s by Vietnamese learners is the presence of the numerals within the same noun phrase, which triggers the application of the plural inflectional morpheme (Young, 1991; Charters et al, forthcoming). It therefore suggests that, for the early learners, teaching the English noun plurals in the context of numerals, such as in *two chairs, six tables, nine chickens*, etc., will possibly facilitate their learning process.

The second implication for teaching comes from the results of the on-line study. Readers, and teachers, are reminded that the objective of the present on-line study was to investigate if on-line experiments of this type can be used to further understand and determine learners' linguistic procedural skills. As the results of the present on-line study do not support this particular aspect in PT's Procedural Skills Hypothesis, application of on-line sentence matching tasks in teaching cannot be recommended.

Finally, it is perhaps appropriate to conclude that the most important insight to be derived from the present thesis is that learners' process of acquiring the English plural morpheme –s may in fact be subject to well-defined constraints of a phonological, morphological, syntactic and even semantic nature. Therefore, the better both SLA researchers and language teachers understand these constraints, the more effective second language teaching can be.

APPENDIX A: Students Profile Questionaire (English Translation)

School:
Class:
Name:

Answer the following questions by circling the appropriate answer:

1. When did you start learning English?
   a. from Kindergarten
   b. from year 1
   c. from year 2
   d. from year 3
   e. from year 4
   f. from year 5
   g. from year 6

2. Whom did you study English with?
   a. with parent/s
   b. with brother/s and/or sister/s
   c. with relative/s
   d. with friend/s
   e. with teacher/s

3. Where did you study English?
   a. at home
   b. in Kindergarten
   c. at primary school
   d. at secondary school
   e. at English learning centres

4. If studying English at a certain school, give the name of the school:

_____

APPENDIX B: Vocabulary Test Sheet

Put a tick in the box next to the word that you know and a cross to the word that you don't know.

Animal	Juice	To change	Fat	To stand	Friend
Apple	Kite	To close	Fine	Dinner	To bring
Aunt	Language	To collect	Green	To plow	Brown
Banana	Lunch	To copy	Heavy	Sausage	Between
Basketball	Menu	To correct	High	Sandwich	Every
Bean	Milk	To damage	Hot	Store	Cart
Bike	Mother	To destroy	Hungry	Winter	Arrive
Board	Motorbike	To drink	Late	Zoo	Dangerous
Book	Night	To drive	Light	Engineer	Fried
Boots	Onion	To eat	Long	Lamp	Iced
Bottle	Packet	To fly	Noisy	Hotel	Natural
Box	Paper	To grow	Orange	Kitchen	Afternoon
Bread	Pen	To help	Purple	Food	Year
Brother	Pencil	To lift	Quiet	Face	Idea
Building	Plant	To like	Red	Beef	Lake
Bus	River	To load	Round	Rice	Meat
Cake	Room	To need	Short	Soccer	To flow
Camera	School	To open	Oval	Tea	Picnic
Can	Schoolbag	To play	Small	Toe	Potato
Car	Shirt	To pollute	Strong	Week	Rain
Carrot	Sister	To produce	Tall	To say	To jog
Cart	Sport	To pull	Thick	Hospital	To swim
Chair	Stereo	To read	Thin	Oil	To skip
Chicken	Street	To recycle	Tired	To come	To visit
Classroom	Student	To ride	Warm	To keep	To burn
Clock	Table	To speak	Weak	To listen	Farmer
Coal	Teacher	To start	White	Name	Father
Coffee	Television	To stay	Yellow	Nose	Finger
Cow	Tent	To take	Ahead	Ocean	Flower
Day	Thing	To want	Always	Hair	Forest
Doctor	Toy	To warn	Fast	To sit	Game
Door	Train	To wash	Near	People	Hand
Desk	Tree	To wear	Never	To walk	Hair
Egg	Truck	To throw	Often	To look	Homework
Farm	Uncle	To unload	Once	Time	After
Beautiful	Behind	Big	Black	Blue	Cold
In front of	Opposite	Sometimes	Window	Twice	Village

APPENDIX C: Description of Tasks

TASK SERIES 1: SCHOOLS, CLASSROOMS AND FRIENDS. (Warm-up: Subject was asked "How long have you studied at this school?" "Do you like your school?" "Why/Why not?")

Task 1.1: (Title: ***What's behind you,*** adapted from Wright, Betteridge & Buckby's *Games for Language Learning*; aiming to elicit lexical plural.) Subject was asked, "Close your eyes and tell me what you can remember in this room." As the room that I would be conducting the tests was very likely one of the vacant classrooms at the school, I expected to hear "Tables", "Chairs", "Boards", "Windows", "Doors", etc.

Task 1.2: (Title: ***Tell the difference***; aiming to elicit phrasal plural.) Subject was presented with 2 pictures of each of a different classroom, the differences lying in the number of doors, windows, tables, benches, clocks, fans, students, etc. Subject was then asked, "These are the two classrooms that you may be familiar with, let's call them Room 1 and Room 2. Tell me the differences between these two rooms." I expected to hear "Room 1 (has) one door", "Room 2 (has) two doors", etc.

Task 1.3: (Title: ***Who is who?*** aiming to elicit possessive.) The students in the two pictures used in sub-task 2 above had names and different colours of dresses, and different hairstyles. Subject was presented with pictures of a certain dress or hairstyle, and was asked, "Whose dress is this?" I expected to hear "Mary's" or "Mary's dress", "Ann's" or "Ann's dress". I would also ask, "Whose hair is this?" and expected to hear either "Kim's" or "Kim's hair", "Jane's" or "Jane's hair", etc.

Task 1.4: (Title: *A day in the life of one of your best friends;* aiming to elicit 3rd-person singular-s.) Subject was asked, "Do you have a lot of friends? Who is your best friend? Can you tell me about her/him? What does she/he usually do everyday?" I expected to hear "My best friend is ... He/She wakes up at ..., gets dressed at ..., has breakfast at ..., rides/walks to school at ..., etc".

TASK SERIES 2: FAMILY AND GAMES (Warm-up: subject was asked to talk about activities that s/he usually had with other members of her/his family.)

Task 2.1: (Title: *Memory game.* A variation of *Kim's game* in Wright Betteridge & Buckby's *Games for Language Learning,* aiming to elicit lexical plural.) On the table, I laid 8 cards with pictures of several objects which were the same on each card, for example, three bananas, two cameras, etc. Subject was told that his/her power of observation and memory was challenged. After giving the subject 15 seconds to look at the cards, I took the cards away. Subject was asked, "Tell me what you can remember on the cards." I expected to hear "Bananas", "Flowers", etc.

Task 2.2: (Title: *Matching cards game,* aiming to elicit phrasal plural.) There were 2 sets of similar object cards, each set had 19 cards of different objects, and the amount of objects on each card ranged from 1 to 3. For example, the first set had a card with the picture of 1 egg, a card with the picture of 3 onions, and the second set had a card with 3 eggs, a card with 2 onions. These cards were arranged this way so that any two matching object cards would have the total number of objects not exceeding 5. This was to cater for the early learners' vocabulary. And at the beginning, subject was told that his/her ability to add quickly was challenged. The cards were shuffled, like in a card game and distributed to the players (in this case, the researcher and the subject) with each had 10 cards. The rest of the cards would be left on the table in a pile. The game began and when any of the players had any

2 cards of the same object, he/she should lay them on the table and declare what he/she had got and how many, I expected to hear, "Four eggs", "Five onions", etc. If a player miscalculated his/her two matching objects and announced the wrong added number, the other player would have those two matching cards. The whole game would have 3 rounds, each round finished when both players ran out of their matching cards, and the player with the most matching cards at the end of the 3rd round would win.

Task 2.3: (Title: ***Family tree,*** aiming to elicit possessive.) Subject was presented with the picture of a big family tree. All people in the picture were identified with a name. At the beginning, subject was told, "This is Jimmy's family tree. He is the youngest person in his big family. The plus sign between these two people (point to a couple) means that they are married. Can you tell me who Jane is?" I expected to hear "Jane is Sam's wife. She is Harry's sister..." etc.

Task 2.4: (Title: ***A day in your father's or mother's life,*** aiming to elicit 3rd-person singular-s.) Subject was asked to talk about his/her mother/father, "Let's talk about your father/mother. What is your father's/mother's name?" "What does he/she usually do every day?" I expected to hear "My father's/mother's name is ... He/She is ... years old. He/She is a/an ... Every morning, he/she wakes up at ..." etc.

TASK SERIES 3: A VILLAGE OF FARMERS. (Warm-up: Subject was asked about his/her personal experience with the theme, "Have you been to a farm before?" "Do you like animals?" "Do you have any dogs/cats at home?") Subject was then presented with 6 cards of 6 farmers and their animals which varied in sizes and colours.

Task 3.1: (Title: *Identification,* aiming to elicit lexical plural.) Subject was asked, "These farmers are from a small village. Look at the pictures of their farms and tell me what animals these farmers all have in common." I expected to hear "Chickens", "Cows", "Dogs", etc.

Task 3.2: (Title: *Tell the difference,* aiming to elicit phrasal plural.) Subject was asked, "Can you tell me the differences in the number of animals that each farmer has?" I expected to hear "Peter has four buffalos, three cows, two dogs, two cats, five ducks. David has 1 buffalo, two cows ... etc."

Task 3.3: (Title: *Whose?* aiming to elicit possessive.) Subject was asked, "Now look carefully at the pictures and tell me whose animals are black and white" I expected to hear "Kim's cows are black and white." or "Kim's cows." or "Ben's cats." etc.

Task 3.4: (Title: *A day in the life of a farmer,* aiming to elicit 3rd-person singular-s.) Subject was asked, "What do you think a farmer usually does everyday?" I expected to hear "He wakes up early every morning, has breakfast, reads newspaper..." etc.

APPENDIX D: A Sample of Data Transcription

(The following transcription is from subject MH, year 10. As the researcher's part is not transcribed, the turn numbers are for subjects only.)

Transcription keys: . short pause (up to 2 seconds)

.. pause (from 2 to 5 seconds)

... long pause (more than 5 seconds)

TASK SERIES 1: SCHOOLS, CLASSROOMS AND FRIENDS. (Warm-up: Subject was asked "How long have you studied at this school?" "Do you like your school?" "Why/Why not?")

1. yes I'm fine
2. yes . I have .. five years . five years
3. I love it .. yes

Task 1.1: (Title: ***What's behind you,*** adapted from Wright, Betteridge & Buckby's *Games for Language Learning*; aiming to elicit lexical plural.) Subject was asked, "Close your eyes and tell me what you can remember in this room." As the room that I would be conducting the tests was very likely one of the vacant classrooms at the school, I expected to hear "Tables", "Chairs", "Boards", "Windows", "Doors", etc.

4. table .. chair ... ceiling fan ... books .. desk .. computer ... and .. you

Task 1.2: (Title: ***Tell the difference***; aiming to elicit phrasal plural.) Subject was presented with the pictures of 2 classrooms with the differences lay in the number of doors, windows, tables, benches, clocks, fans, students, etc. Subject was then

asked, "These are the two classrooms that you may be familiar with, let's call them Room 1 and Room 2. Tell me the differences between these two rooms." I expected to hear "Room 1 (has) one door", "Room 2 (has) two doors", etc.

5. in the picture one . this room have only one clock oh watch and classroom two have four clock . and in this room have two people and here have five people .. in here no have a chair .. which was brown .. which were brown and this here have it .. and in here have two people clean the board . and .. have no . just only one one person clean the board and in here . have two people clean the board . and in here . in the classroom one . picture one . Mary .. collect his tool . her tool . her tool . and in here . three people are going to get out of the room
6. yes . and in the picture one have three board . oh have just only one board and in the picture two have three boards
7. oh . picture one just only have one door and in here have two door and one have a window and in here have no window
8. um ... oh . teacher ... he sit in the teaching ... teacher . teaching table

APPENDIX E: Example of Distributional Analysis for Individuals

Subject: *HAn*		Examples
Lexical Plural –s		
Singular Noun + Ø	4	"clock"
Singular Noun + s	8	"lamps"
Total Types: 8/12 Tokens: 8/12		
Phrasal Plural –s		
Modifier/ numeral (plural) + singular noun + Ø	1	"five bus"
Modifier/ numeral (plural) + singular noun + s	15	"three boards"
Modifier/ numeral (singular) + singular noun + s	1	"a dogs"
Modifier/ numeral (singular) + singular noun + Ø	3	"one board"
Total Types: 11/12 Tokens: 15/16		
Possessive –s		
Possessor + Ø	17	"the teacher [dress]"
Possessor + s	8	"Sam's wife"
Total Types: 5/13 Tokens: 8/25		
3rd-person-singular –s		
time reference, present aspect, simple		
lexical verb (stem) + Ø	4	"she play"
lexical verb (stem) + s	1	"he continues"
subject + 's + lexical verb (stem)	5	"he's grow"
Total Types: 1/6 Tokens: 1/10		

Conventions: 8/12 - (number of suppliance / number of contexts)

APPENDIX F. All subjects: Number of supplied types and tokens (lexical variations)/contexts, morphological variations and other contexts

	Subject	Lexical Plural–s	Phrasal Plural –s		Possessive –s		Inter-Phrasal-s		
		Lex. Var./Contexts	Lex. Var./Contexts	Mor. Var	Lex. Var./Contexts	Others	Lex. Var./Contexts	Mor. Var	Others
1	AT	Types: 0/7 Tokens: 0/7	Types: 0/7 Tokens: 0/7	0	Types: 0/5 Tokens: 0/8	2 "of"	Types: 0/0 Tokens: 0/0	0	1 (S+V+ing)
2	BK	Types: 1/11 Tokens: 1/11	Types: 8/14 Tokens: 9/21	2	Types: 6/8 Tokens: 10/15	8 "of"	Types: 0/8 Tokens: 0/15	0	2 (S+'s+V)
3	BT	Types: 7/12 Tokens: 7/15	Types: 12/13 Tokens: 20/23	5	Types: 11/13 Tokens: 19/24		Types: 0/10 Tokens: 0/12	0	13 (S+'s+V)
4	DP	Types: 0/9 Tokens: 0/9	Types: 10/10 Tokens: 19/20	2	Types: 15/16 Tokens: 30/33		Types: 1/7 Tokens: 1/11	0	3 (S+'s+V)
5	DT	Types: 5/13 Tokens: 5/14	Types: 8/13 Tokens: 14/21	2	Types: 3/12 Tokens: 4/26		Types: 0/10 Tokens: 0/12	0	
6	HAn	Types: 8/12 Tokens: 8/12	Types: 11/12 Tokens: 15/16	3	Types: 5/13 Tokens: 8/25		Types: 1/6 Tokens: 1/10	0	5 (S+'s+V)
7	HAu	Types: 5/8 Tokens: 5/9	Types: 9/15 Tokens: 11/21	2	Types: 9/9 Tokens: 16/16	9 "of"	Types: 4/13 Tokens: 4/16	1	
8	HT	Types: 4/8 Tokens: 4/10	Types: 10/15 Tokens: 18/24	2	Types: 7/15 Tokens: 7/24	7 "of"	Types: 2/5 Tokens: 2/10	0	
9	HD	Types: 13/13 Tokens: 17/18	Types: 9/12 Tokens: 25/28	2	Types: 13/15 Tokens: 24/26	4 "of"	Types: 5/13 Tokens: 7/18	2	
10	HL	Types: 7/7 Tokens: 7/7	Types: 10/12 Tokens: 22/24	2	Types: 3/8 Tokens: 5/15	6 "of"	Types: 3/12 Tokens: 3/14	0	1 (S+'s+V)
11	KH	Types: 4/15 Tokens: 4/17	Types: 2/15 Tokens: 2/25	1	Types: 0/9 Tokens: 0/15	15 "of"	Types: 1/5 Tokens: 1/6	0	5 (S+'s+V
12	KiA	Types: 2/12 Tokens: 3/13	Types: 12/17 Tokens: 16/24	2	Types: 6/11 Tokens: 8/16	10 "of"	Types: 0/8 Tokens: 0/10	0	1 (S+'s+V)
13	KV	Types: 1/9 Tokens: 1/11	Types: 0/10 Tokens: 0/16	0	Types: 9/11 Tokens: 13/20	1 "of"	Types: 0/8 Tokens: 0/14	0	
14	KyA	Types: 1/7 Tokens: 1/9	Types: 9/12 Tokens: 14/17	1	Types: 3/4 Tokens: 4/5	13 "of"	Types: 0/5 Tokens: 0/5	0	
15	MD	Types: 4/13 Tokens: 4/17	Types: 9/16 Tokens: 14/23	1	Types: 6/12 Tokens: 9/20	1 "of"	Types: 0/12 Tokens: 0/13	0	3 (S+'s+V)
16	MH	Types: 3/18 Tokens: 4/20	Types: 12/15 Tokens: 17/24	4	Types: 0/0 Tokens: 0/0	12 "of" 5 "belong"	Types: 1/8 Tokens: 1/8	0	1 (S+'s+V)
17	MN	Types: 1/13 Tokens: 1/15	Types: 1/15 Tokens: 1/23	0	Types: 0/2 Tokens: 0/2	9 "of"	Types: 1/3 Tokens: 1/4	0	2 (S+'s+V)
18	MT	Types: 0/20 Tokens: 0/20	Types: 2/12 Tokens: 5/31	1	Types: 1/9 Tokens: 1/21	13 "of"	Types: 0/4 Tokens: 0/5	0	
19	NHL	Types: 3/7 Tokens: 3/7	Types: 7/21 Tokens: 7/28	1	Types: 5/8 Tokens: 6/13	1 "of"	Types: 0/2 Tokens: 0/2	0	6 (S+'s+V)
20	NTh	Types: 1/7 Tokens: 1/7	Types: 1/11 Tokens: 1/12	0	Types: 0/4 Tokens: 0/6		Types: 0/0 Tokens: 0/0	0	
21	NTi	Types: 7/9 Tokens: 8/10	Types: 7/14 Tokens: 12/20	1	Types: 7/11 Tokens: 12/19	12 "of"	Types: 3/9 Tokens: 5/13	0	1 (S+'s+V)
22	NTr	Types: 3/16 Tokens: 3/18	Types: 7/13 Tokens: 11/23	2	Types: 0/1 Tokens: 0/1	24 "of"	Types: 1/7 Tokens: 1/16	0	1 (S+'s+V)
23	PHL	Types: 11/15 Tokens: 12/16	Types: 9/10 Tokens: 11/12	3	Types: 11/14 Tokens: 18/20	2 "of"	Types: 1/5 Tokens: 1/10	0	5 (S+'s+V)
24	QB	Types: 10/17 Tokens: 11/19	Types: 11/12 Tokens: 18/21	3	Types: 10/16 Tokens: 13/26		Types: 2/8 Tokens: 2/8	0	2 (S+'s+V)
25	TA	Types: 4/22 Tokens: 4/23	Types: 3/21 Tokens: 3/24	1	Types: 4/6 Tokens: 6/8	11 "of"	Types: 1/17 Tokens: 1/21	0	
26	TH	Types: 12/16 Tokens: 14/18	Types: 19/20 Tokens: 28/30	5	Types: 13/13 Tokens: 27/27		Types: 2/14 Tokens: 2/16	0	
27	ThHu	Types: 3/14 Tokens: 3/22	Types: 1/13 Tokens: 1/21	0	Types: 12/15 Tokens: 23/29		Types: 2/9 Tokens: 2/10	0	4 (S+'s+V)
28	TN	Types: 2/6 Tokens: 2/9	Types: 0/14 Tokens: 0/24	0	Types: 0/4 Tokens: 0/7	17 "of"	Types: 1/4 Tokens: 1/4	0	2 (S+'s+V)
29	TTu	Types: 4/5 Tokens: 6/7	Types: 6/16 Tokens: 7/20	1	Types: 1/5 Tokens: 1/7	2 "of"	Types: 0/6 Tokens: 0/7	0	2 (S+V+ing)
30	TTr	Types: 6/10 Tokens: 6/10	Types: 21/22 Tokens: 24/26	3	Types: 10/11 Tokens: 17/25	8 "of"	Types: 4/15 Tokens: 4/19	1	
31	TrHu	Types: 4/12 Tokens: 4/15	Types: 2/12 Tokens: 2/17	2	Types: 0/2 Tokens: 0/2	5 "of"	Types: 0/8 Tokens: 0/8	0	
32	VA	Types: 4/5 Tokens: 4/5	Types: 11/12 Tokens: 11/13	2	Types: 5/5 Tokens: 7/8	12 "of"	Types: 4/7 Tokens: 4/10	2	
33	VC	Types: 6/11 Tokens: 7/14	Types: 8/17 Tokens: 12/27	2	Types: 1/4 Tokens: 1/7	12 "of"	Types: 0/4 Tokens: 0/4	0	2 (S+'s+V)
34	XD	Types: 10/11 Tokens: 11/13	Types: 11/12 Tokens: 16/20	3	Types: 8/10 Tokens: 14/17	3 "of"	Types: 1/12 Tokens: 1/15	0	1 (S+'s+V)
35	XT	Types: 1/22 Tokens: 1/23	Types: 2/11 Tokens: 2/33	1	Types: 0/6 Tokens: 0/10		Types: 0/6 Tokens: 0/7	0	
36	YN	Types: 0/14 Tokens: 0/17	Types: 2/13 Tokens: 2/19	1	Types: 0/8 Tokens: 0/14	9 "of"	Types: 0/4 Tokens: 0/4	0	2 (S+'s+V)

Convention: **Lex. Var.**: Lexical Variation – **Mor. Var.**: Morphological Variation – **Others**: other contexts
Lex. Var. or **Mor. Var./Contexts**: number of Lexical or Morphological Variation/number of Contexts

APPENDIX G: Experimental Sentences

List A: Lexical Plural-s

1. They wear boots. / They wear *boot.*
2. We need doctors. / We need *doctor.*
3. I like animals. / I like *animal.*
4. They destroy forests. / They destroy *forest.*
5. We recycle papers. / We recycle *paper.*
6. I grow bananas. / I grow *banana.*
7. They bring toys. / They bring *toy.*
8. We take trains. / We take *train.*
9. I visit friends. / I visit *friend.*
10. They burn coals. / They burn *coal.*
11. We change rooms. / We change *room.*
12. I collect cans. / I collect *can.*
13. They damage cars. / They damage *car.*
14. We wash things. / We wash *thing.*
15. I want carrots. / I want *carrot.*
16. We eat eggs. / We eat *egg.*
17. They pull carts. / They pull *cart.*
18. I unload trucks. / I unload *truck*
19. They pollute rivers. / They pollute *river*
20. We produce cameras. / We produce *camera.*

List B: Phrasal Plural-s

1. I have three brothers. / I have three *brother*.
2. They open four packets. / They open four *packet*.
3. We help two students. / We help two *student*.
4. I take five pencils. / I take five *pencil*.
5. They burn four buildings. / They burn four *building*.
6. We destroy two clocks. / We destroy two *clock*.
7. I collect five cans. / I collect five *can*.
8. We bring three friends. / We bring three *friend*.
9. They produce five televisions. / They produce five *television*.
10. We play four sports. / We play four *sport*.
11. I copy two books. / I copy two *book*.
12. They damage three doors. / They damage three *door*.
13. I want two bananas. / I want two *banana*.
14. They load four carts. / They load four *cart*.
15. I grow three plants. / I grow three *plant*.
16. We need five chairs. / We need five *chair*.
17. They unload three trucks. / They unload three *truck*.
18. We lift four boards. / We lift four *board*.
19. They stay five nights. / They stay five *night*.
20. We drive two cars. / We drive two *car*.

List C: Possessive-s

1. We bring Ben's book. / We bring *Ben* book.
2. They burn Kim's bread. / They burn *Kim* bread.
3. I change John's shirt. / I change *John* shirt.
4. We close Mary's room. / We close *Mary* room
5. They copy Tom's brother. / They copy *Tom* brother.
6. I correct Ben's homework. / I correct *Ben* homework.
7. They damage Kim's chair. They damage *Kim* chair.
8. I drink John's juice. / I drink *John* juice.
9. We drive Mary's car. / We drive *Mary* car.
10. They eat Tom's cake. / They eat *Tom* cake.
11. I fly Ben's kite. / I fly *Ben* kite.
12. We like Kim's sister. / We like *Kim* sister.
13. They need John's camera. / They need *John* camera.
14. I open Mary's box. / I open *Mary* box.
15. We play Tom's game. / We play *Tom* game.
16. They pull Ben's hand. / They pull *Ben* hand.
17. I ride Kim's bike. / I ride *Kim* bike.
18. We take John's basketball. / We take *John* basketball.
19. They throw Mary's apple. / They throw *Mary* apple.
20. I want Tom's pen. / I want *Tom* pen.

List D: 3rd-person-singular-s

1. She brings her friend. / She *bring* her friend.
2. He burns his finger. / He *burn* his finger.
3. She wants her menu. / She *want* her menu.
4. He warns his brother. / He *warn* his brother.
5. She corrects her homework. / She *correct* her homework.
6. He destroys his chair. / He *destroy* his chair.
7. She drinks her milk. / She *drink* her milk.
8. He starts his car. / He *start* his car.
9. She eats her lunch. / She *eat* her lunch.
10. He grows his hair. / He *grow* his hair.
11. She helps her sister. / She *help* her sister.
12. He speaks his language. / He *speak* his language.
13. She visits her school. / She *visit* her school.
14. He loads his truck. / He *load* his truck.
15. She needs her mother. / She *need* her mother.
16. He opens his window. / He *open* his window.
17. She plays her game. / She *play* her game.
18. He wears his shirt. / He *wear* his shirt.
19. She reads her book. / She *read* her book.
20. He throws his banana. / He *throw* his banana.

APPENDIX H: On-line Experiment Raw Data File

Scenario - experiment1.sce
Logfile written - 9/29/2003 11:31:06 AM

Trial	Event Type	Code	Time	TTime	Uncer-tainty	Dura-tion	Uncer-tainty	Req-time	Req-dur
1	Picture	Sentence1	-9831	0	1	10121	3	0	10000
1	Picture	Sentence2	290	10121	2	8605	4	10000	10000
1	Response	3	8824	18655	2				
1A	Response	1	15020	6125	2				
2	Picture	Sentence3	28466	0	2	10123	4	0	10000
2	Picture	Sentence4	38589	10123	2	7086	4	10000	10000
2	Response	2	45533	17067	2				
2A	Response	1	50061	4386	3				
...	...	...	...	...	...	...	...	...	...

Where,

. '***Experiment***' indicates the experiment session, valued from 1 to 4;

. '***Trial***' indicates appearance of each pair of test sentences, valued from 1 to 76; Trial value+a letter (eg. 1A, 2A ...) indicates the feedback message.

. '***Event***' is the type of the event, which can be 'Picture', 'Sound', 'Response' etc;

. '***Code***' is given to each test sentence and type of response for recognition and analysis purpose: '1' indicates mouse button, '2' indicates "non-matching" response, and '3' indicates "matching" response;

. '***Time***' is the starting time of each event, relative to the starting time of the whole experiment session, in milliseconds with 1 decimal point, for example '290' should be read as "at 29.0 milliseconds", etc;

. '***TTime***' is the same as 'Time' above, except measured relative to the start of the trial the event is in;

. '***Uncertainty***' is the uncertainty time in the 'Time' and 'TTime' values. If an event has time *t* with uncertainty *dt*, this means that the event occurred between time *t* and time *t* + *td*;

. '***Duration***' stands for 'Systems Duration'. For picture stimuli, this is the duration of the picture, in this case the duration of each test sentence.

. The second '***Uncertainty***' column stands for 'Duration Uncertainty', is the uncertainty in the time given for the duration of a picture stimulus.

. '***Req-time***' stands for 'Request time', indicates requested starting time.

. '***Req-dur***' stands for 'Request duration', indicates requested duration for each sentence.

APPENDIX I: Subjects' Mean RTs, Difference in Mean Total (Diff in Total) in msec and Number of Correct Responses (NCR).

Appendix Ia: Native Speakers

	Grammatical						Ungrammatical						Diff
Subj.	LP-s	PP-s	PO-s	3rd-s	Total	NCR	LP-s	PP-s	PO-s	3rd-s	Total	NCR	in Total
AlT	608.0	630.0	697.0	687.1	**655.4**	78	624.6	681.4	668.5	675.3	**662.4**	80	+7.0
AmB	552.7	688.4	690.0	674.7	**651.3**	76	513.5	659.1	720.6	648.2	**634.7**	78	-16.6
BP	627.6	721.1	717.2	711.7	**694.4**	80	626.4	706.1	728.1	707.6	**692.1**	80	-2.3
G	501.2	541.1	596.2	544.5	**545.7**	80	519.2	537.7	559.2	528.0	**535.7**	79	-10
HG	617.1	679.6	702.4	659.5	**664.4**	75	624.6	634.3	635.6	616.7	**627.7**	77	-36.7
HT	823.8	875.0	879.9	882.9	**864.9**	77	799.8	870.4	877.9	851.8	**850.3**	77	-14.6
LG	534.7	592.1	590.5	604.4	**579.5**	75	509.6	614.1	625.2	629.4	**594.0**	75	+14.5
MM	513.4	561.1	574.3	572.3	**554.8**	76	497.3	557.7	569.3	590.7	**554.5**	79	-0.3
RW	928.5	1028.1	948.6	988.3	**972.3**	77	978.9	961.1	973.8	984.2	**974.4**	79	+2.1
SM	443.8	425.4	484.8	423.8	**444.2**	78	394.0	419.1	488.2	410.2	**426.4**	77	-17.8
SH	799.9	875.5	850.0	853.3	**845.2**	79	804.4	818.0	839.7	870.4	**833.1**	80	-12.1
TO	593.3	665.8	616.0	637.8	**628.3**	75	611.0	661.4	722.6	643.4	**659.6**	79	+31.3

Appendix Ib: Vietnamese Learners' Mean RTs and No. of Correct Responses (NCR)

	Grammatical						Ungrammatical						Diff in
Subj.	LP-s	PP-s	PO-s	3rd-s	Total	NCR	LP-s	PP-s	PO-s	3rd-s	Total	NCR	Total
AT	714.1	754.8	750.3	756.5	**743.8**	79	669.1	826.0	774.8	830.6	**775.1**	80	+31.3
BK	618.5	761.2	817.3	698.0	**720.4**	76	528.5	746.8	704.9	701.2	**671.4**	77	-49.0
BT	676.5	771.2	716.1	727.7	**723.0**	77	593.6	737.3	699.6	741.0	**694.1**	79	-28.9
DP	546.7	658.2	637.3	584.8	**605.6**	76	511.9	597.2	590.3	540.8	**559.1**	78	-46.5
DT	595.8	727.0	701.3	624.9	**660.7**	77	555.3	693.5	679.1	649.1	**645.3**	78	-15.4
Han	521.6	607.2	621.6	642.6	**597.1**	78	511.9	612.1	621.8	622.8	**591.1**	77	-6.0
HAu	589.3	677.1	684.4	614.4	**641.3**	80	531.0	595.6	595.9	597.8	**579.8**	79	-61.5
HT	523.2	556.2	631.5	564.1	**569.1**	78	482.8	543.0	514.1	511.7	**512.9**	80	-56.2
HD	680.0	735.3	740.1	703.8	**715.2**	79	666.4	688.8	722.1	687.0	**691.1**	80	-24.1
HL	687.8	776.3	805.7	783.8	**763.4**	80	645.5	746.0	765.5	776.8	**733.5**	80	-29.9
KH	753.4	850.6	818.7	797.8	**805.0**	73	679.7	786.0	836.3	859.9	**790.2**	75	-14.8
KV	546.1	603.7	594.7	595.2	**585.2**	78	520.0	596.5	622.8	604.0	**586.5**	78	+1.3
KiA	567.2	629.1	648.8	602.4	**612.0**	78	545.0	572.2	600.7	614.0	**583.0**	80	-29.0
KyA	648.9	812.2	730.1	736.4	**731.9**	80	647.4	671.2	690.7	666.2	**668.9**	79	-63.0
MD	678.9	735.0	721.6	704.4	**709.9**	78	562.4	693.1	658.7	711.2	**656.4**	77	-53.5
MH	557.3	685.5	673.1	649.1	**638.3**	73	566.8	687.6	673.2	647.7	**642.9**	78	+4.6
MN	515.5	542.3	555.1	537.7	**537.3**	77	539.3	543.6	534.3	526.6	**536.0**	79	-1.3
MT	540.3	673.4	690.9	676.2	**649.0**	76	563.1	717.1	591.4	642.8	**628.6**	80	-20.4
NHL	593.3	693.6	709.1	660.3	**664.8**	76	620.7	644.7	622.0	683.4	**642.6**	78	-22.2
NTr	563.5	626.2	599.4	593.0	**595.3**	74	532.4	586.8	578.8	600.0	**574.3**	79	-21.0
NTi	620.2	856.0	740.0	760.8	**744.3**	79	580.6	760.5	693.5	813.5	**709.0**	75	-35.3
NTh	850.2	831.0	862.7	894.3	**860.2**	77	913.7	915.2	862.4	913.7	**900.2**	74	+40
PHL	469.9	506.1	516.8	508.4	**499.6**	75	424.6	503.1	523.9	478.6	**483.0**	76	-16.6
QB	558.4	656.5	592.8	552.8	**589.7**	77	523.2	594.3	596.0	595.7	**576.6**	77	-13.1
ThHu	655.7	707.1	706.3	711.1	**695.2**	72	668.0	746.7	668.0	707.1	**695.4**	73	+0.2
ThTu	622.4	607.5	593.0	594.8	**604.5**	73	568.2	595.4	581.1	598.0	**585.5**	79	-19
ThTr	556.7	529.1	516.4	519.7	**530.5**	80	506.6	510.0	487.4	521.8	**506.4**	79	-24.1
ThHa	651.9	751.2	758.2	782.2	**734.8**	77	610.8	735.2	640.3	692.1	**670.0**	79	-64.8
TA	749.8	835.7	811.5	836.8	**807.7**	77	706.2	732.7	745.9	799.6	**746.1**	80	-61.6
TN	611.0	784.7	808.3	729.8	**731.8**	78	627.3	823.7	744.8	733.8	**732.4**	79	+0.6
TrHu	773.9	869.2	886.2	862.2	**848.5**	77	753.9	858.5	925.2	845.4	**845.6**	77	-2.9
VA	704.2	944.2	886.4	828.5	**844.7**	76	742.9	854.0	854.7	798.7	**812.2**	78	-32.5
VC	722.2	809.0	775.2	804.0	**777.6**	80	686.6	850.0	759.2	733.2	**755.2**	77	-22.4
XD	512.6	627.2	680.8	558.4	**594.8**	80	533.2	573.3	559.4	617.4	**571.3**	79	-23.5
XT	590.0	706.9	661.9	585.7	**635.4**	74	607.0	580.8	670.8	646.5	**627.8**	76	-7.6
YN	770.7	794.5	764.2	779.7	**777.3**	79	650.3	773.2	834.4	748.8	**751.4**	79	-25.9

BIBLIOGRAPHY

Abrahamsson, N. (2001). *Acquiring L2 Syllable Margins*. Stockholm: Centre for Research on Bilingualism.

Aljaafreh, A. and J. P. Lantolf (1994). "Negative feedback as regulation and second language learning in the Zone of Proximal Development." *Modern Language Journal* 78, 465-483.

Andersen, R. W. (1978). "An implicational model for second language research." *Language Learning* 28, 221-282.

Anderson, J. (1983). "Syllable simplification in the speech of second language learners." *Interlanguage Studies Bulletin* 7, 4-36.

Anton, M. and F. J. DiCamilla (1999). "Socio-cognitive functions of L1 collaborative interaction in the L2 classroom." *Modern Language Journal* 83, 233-247.

Ard, J. and T. Homburg (1983). "Verification of language transfer." In S. Gass and L. Selinker (eds.) *Language Transfer in Language Learning*. Rowley, MA: Newbury House, 157-176.

Ayoun, D. (2001). "The role of negative and positive feedback in the second language acquisition of passé-composé and the imparfait." *Modern Language Journal* 85, 226-243.

Bailey, N., C. Madden, and S. Krashen (1974). "Is there a 'natural sequence' in adult second language learning?" *Language Learning* 24, 235-243.

Bamber, D. (1969). "RTs and error rates for same-different judgements of multidimensional stimuli." *Perception & Psychophysics* 6, 169-174.

Bart, W. M. and D. J. Krus (1973). "An ordering-theoretic method to determine hierarchies among items." *Educational and Psychological Measurement* 33, 291-300.

Bates, E. and B. MacWhinney (1982). "Functionalist approaches to grammar." In E. Wanner and L. R. Gleitman (eds.) *Language Acquisition: the State of the Art.* Cambridge: Cambridge University Press, 173-218.

Beck, M-L. (1998). "L2 acquisition and obligatory head movement: English-speaking learners of German and the local impairment hypothesis." *Studies in Second Language Acquisition* 20, 311-348.

Benson, B. (1988). "Universal preference for the open syllable as an independent process in interlanguage phonology." *Language Learning* 38, 221-242.

Berko, J. (1958). "Berko's Test of Morphology." In *The Research Instrument Project (TRIP) Monograph, Measures for Research and Evaluation in the English Language Arts.* The Committee on Research of the National Council of Teachers of English.

Bley-Vroman, R. and D. Masterson (1989). "Reaction time as a supplement to grammaticality judgements in the investigation of second language learner's competence." *University of Hawaii Working Papers in ESL* 8, 207-37.

Bliss, H. (2006). "L2 acquisition of inflectional morphology: Phonological and morphological transfer effects." In M. G. O'Brien, C. Shea and J. Archibald (eds.) *Proceedings of the 8th Generative Approaches to Second Language Acquisition Conference (GASLA 2006)*. Somerville, MA: Cascadilla Proceedings Project, 1-8.

Bloomfield, L. (1933). *Language*. New York: Holt, Rinehart and Winston.

Bock, K. and C. A. Miller (1991). "Broken agreement." *Cognitive Psychology* 23, 45-93.

Bock, K., K. M. Eberhard and J. C. Cutting (1992). "Controlling number agreement on verbs and anaphors." Paper presented at the 33rd Annual Meeting of the Psychonomic Society, St. Louis, Missouri.

Bock, K. and K. M. Eberhard (1993). "Meaning, sound and syntax in English number agreement." *Language and Cognitive Processes* 8, 57-99.

Bock, K., J. Nicol and J. C. Cutting (1999). "The ties that bind: Creating number agreement in speech." *Journal of Memory and Language* 40, 330-346.

Boss, B. (1996). 'German grammar for beginners – the Teachability Hypothesis and its relevance to the classroom.' In C. Arbonés Solá, J. Rolon-Ianziti and R. Sussex, (eds.) "Who's Afraid of Teaching Grammar?" *Papers in Language and Linguistics*. Queensland: University of Queensland, 93-103.

Brown, R. (1973). *A First Language: The Early Stages*. Cambridge, MA: Harvard University Press.

Bruhn de Garavito, J. (2007). "Acquisition of the Spanish plural by French L2 speakers: The role of transfer." In J. Liceras, H. Zobl and H. Goodluck (eds.) *The Role of Formal Features in Second Language Acquisition.* Mahwah, NJ: Laurence Erlbaum, 273-300.

Bygate, M. (1996). "Effects of task repetition: appraising the development of second language learners." In J. Willis and D. Willis (eds.) *Challenge and Change in Language Teaching*. Oxford: Heinemann, 85-111.

Bygate, M., P. Skehan and M. Swain (eds.) (2001). *Researching Pedagogic Tasks: Second Language Learning, Teaching and Testing*. New York: Longman.

Carlson, G. N. (1977a). *Reference to Kinds in English.* Ph.D. Dissertation, University of Massachusetts at Amherst.

Carlson, G. N. (1977b). "A unified analysis of the English bare plural." *Linguistics and Philosophy* 1, 413-456.

Chambers, S. and K. Forster (1975). "Evidence for lexical access in a simultaneous matching task." *Memory and Cognition* 3, 549-559.

Charters, A. H. (2005). *The Second Language Acquisition of Mandarin Nominal Syntax.* Ph.D Thesis, University of Auckland (Dept. of Applied Language Studies and Linguistics).

Charters, H., L. Dao and L. M. Jansen (forthcoming). "Reassessing the application of Processability Theory: The case of ESL nominal plural marking".

Chomsky, N. (1957). *Syntactic Structures*. The Hague: Mouton.

Chomsky, N. (1959). "Review of B. F. Skinner's *Verbal Behaviour*." *Language* 35, 26-58.

Chomsky, N. (1965). *Aspects of the Theory of Syntax*. Cambridge: MIT Press.

Chomsky, N. (1980). *Rules and Representations*. New York: Columbia University Press.

Chomsky, N. (1981a). *Lectures on Government and Binding*. Dordrecht, Holland: Foris.

Chomsky, N. (1981b). "Principles and Parameters in Syntactic Theory." In N. Hornstein and D. Lightfoot (eds.) *Explanation in Linguistics: The Logical Problem of Language Acquisition*. London: Longman, 32-75.

Clahsen, H. (1984). "The acquisition of German word order: A test case for cognitive approach to L2 development." In R. Anderson (ed.) *Second Languages: A Cross-Linguistic Perspective*. Rowley, MA: Newbury House, 219-242.

Clahsen, H. and U. Hong (1995). "Agreement and null subjects in German L2 development: new evidence from reaction-time experiments." *Second Language Research* 11, 57-87.

Clahsen, H., J. Meisel and M. Pienemann (1983). *Deutsch als Zweitsprache. Der Spracherwerb Ausländischer Arbeiter*. Tübingen: Gunter Narr.

Cohen, A. (2005). "More than bare existence: An implicature of existential bare plurals." *Journal of Semantics* 22, 389-400.

Corder, S. P. (1967). "The sinificance of learners' errors." *International Review of Applied Linguistics* 5, 161-169.

Coughlan, P. and P. A. Duff (1994). "Same task, different activities: analysis of an SLA task from an activity theory perspective." In J. P. Lantolf and G. Appel (eds.) *Vygoskian Apporaches to Second Language Research.* Norwood, NJ: Ablex Publishing Corporation, 173-194.

Crain, S. and J. Fodor (1987). "Sentence matching and overgeneration." *Cognition* 26, 123-169.

Crookes, G. (1986). "Task classification: a cross-disciplinary review." *Technical Report* 4. Centre for Second Language Classroom Research, Social Science Research Institute, University of Hawaii: Honolulu.

Crookes, G. and S.M. Gass (eds.) (1993). *Tasks and Language Learning: Integrating Theory and Practice.* Clevedon: Multilingual Matters.

DeCamp, D. (1971). "Implicational scales and sociolinguistic linearity." *Linguistics* 73, 30-43.

De Villiers, J. and P. De Villiers (1973). "A cross-sectional study of the acquisition of grammatical morphemes in child speech." *Journal of Psycholinguistic Research* 2, 267-278.

Di Biase, B. (2002). "Focusing strategies in second language development: a classroom-based study of Italian L2 in primary school." In B. Di Biase (ed.) *Developing a Second Language: Acquisition, Processing and Pedagogy of Arabic, Chinese, English, Italian, Japanese, Swedish.* Language Australia Ltd, 95-120.

Diehl, E. H., S. Christen, I. Leuenberger, T. Pelvat and T. Studer (2000). *Grammatikunterricht: Alles für der Katz? Untersuchungen zum Zweitspracherwerb Deutsch.* Tübingen: Niemeyer.

Dittmar, N. (1982). "'Ich fertig arbeite – nicht mehr spreche Deutsch': semantische Eigenschaften pidginisierter Lernervarietaten des Deutschen." *Zeitschrift für Lieraturwissenschaft und Linguistik* 45, 9-34.

Dobson, A. J. (1990). *An Introduction to Generalised Linear Models.* New York: Chapman and Hall.

Donato, R. (1994). "Collective scaffolding in second language learning." In J. P. Lantolf and G. Appel (eds.) *Vygotskian Approaches to Second Language Research.* Norwood, NJ: Ablex Publishing Corporation, 33-56.

Donato, R. and D. McCormick (1994). "A sociocultural perspective on language learning strategies: the role of mediation." *Modern Language Journal* 78, 453-464.

Doughty, C. (1991). "Second language instruction does make a difference: Evidence from an empirical study on SL relativization." *Studies in Second Language Acquisition* 13, 431-469.

Doughty, C. and J. Williams (eds.) (1998). *Focus on Form in Classroom Second Language Acquisition*. Cambridge: Cambridge University Press.

Duff, P. (1986). "Another look at interlanguage talk: Taking task to task." In R. Day (ed.) *Talking to Learn: Conversation in Second Language Acquisition*. Rowley, MA: Newbury House, 147-181.

Duffield, N., P. Prevost and L. White (1997). "A psycholinguistic investigation of clitic placement in second language acquisition." In E. Hughes, M. Hughes and A. Greenhill (eds.) *Proceedings of the 21st Boston University Conference on Language Development*. Sommervill, MA: Cascadilla Press, 148-159.

Duffield, N., S. Monrul, J. Bruhn de Garavito and L. White (1998). "Determining L2 knowledge of Spanish clitics on-line and off-line." In A. Greenhill, M. Hughes, H. Littlefield and H. Walsh (eds.) *Proceedings of the 22nd Boston University Conference on Language Development*. Somerville, MA: Cascadilla Press, 177-188.

Duffield, N. and L. White (1999). "Assessing L2 knowledge of Spanish clitic placement: convergent methodologies." *Second Language Research* 15, 133-160.

Dulay, H. C. and M. K. Burt (1972). "Goofing: an indicator of children's second language learning strategies." *Language Learning* 22, 235-252.

Dulay, H. C. and M. K. Burt (1973). "Should we teach children syntax?" *Language Learning* 23, 245-258.

Dulay, H. C. and M. K. Burt (1974a). "Natural sequences in child second language acquisition." *Language Learning* 24, 37-53.

Dulay, H. C. and M. K. Burt (1974b). "A new perspective on the creative construction processes in child second language acquisition." *Language Learning* 24, 253-278.

Dulay, H. C. and M. K. Burt (1975). "Creative construction in second language learning and teaching." In M. K. Burt and H. C. Dulay (eds.) *New Directions in Second Language Learning, Teaching, and Bilingual Education.* Washington, D.C.: TESOL, 21-32.

Dulay, H. C., M. K. Burt and S. Krashen (1982). *Language Two.* New York: Oxford University Press.

Dunn, W. and J. P. Lantolf (1998). "Vygotsky's zone of proximal development and Krashen's I + 1: incommensurable constructs; incommensurable theories." *Language Learning* 48, 411-442.

Dyson, B. (2004). *Developmental Style in Second Language Processing: A Study of Inter-Learner Variation in the Acquisition of English as a Second Language.* Ph.D Dissertation, University of Western Sydney.

Dyson, B. (forthcoming). "Rethinking the ESL developmental stages: a longitudinal study."

Egeth, H. E. (1966). "Parallel versus serial processes in multidimensional stimulus discrimination." *Perception and Psychophysics* 1, 245-252.

Eichelman, W. H. (1970). "Familiarity effects in the simultaneous matching task." *Journal of Experimental Psychology* 86, 275-282.

Ellis, R. (1985). "Sources of variability in interlanguage." *Applied Linguistics* 6, 118-131.

Ellis, R. (1994). *The Study of Second Language Acquisition.* Oxford: Oxford University Press.

Ellis, R. (2004). *Task-based Language Learning and Teaching.* New York: Oxford University Press.

Ellis, R. and G. Barkhuizen (2005). *Analysing Learner Language.* New York: Oxford University Press.

Eubank, L. (1993). "Sentence matching and processing in L2 development." *Second Language Research* 9, 253-280.

Forster, K. (1979). "Levels of processing and the structure of the human language processor." In W. E. Cooper and E. Walker (eds.) *Sentence Processing: Psycholinguistic Studies Presented to Merrill Garrett.* Hillsdale, NJ: Lawrence Erlbaum Associates, 27-85.

Frawley, W. and J. P. Lantolf (1985). "Second language discourse: A Vygotskyan perspective." *Applied Linguistics* 6, 19-44.

Freedman, S. and K. Forster (1985). "The psychological status of overgenerated sentences." *Cognition* 19, 101-131.

Garrett, M. F. (1976). "Syntactic processes in sentence production." In R. Wales and E. Walker (eds.) *New Approaches to Language Mechanisms*. Amsterdam: North-Holland, 231-256.

Garrett, M. F. (1980). "Levels of processing in language production." In B. Butterworth (ed.) *Language Production. Vol. 1: Speech and Talk*. London: Academic Press, 170-220.

Garrett, M. F. (1982). "Production of speech: observations from normal and pathological language use." In A. W. Ellis (ed.) *Normality and Pathology in Cognitive Functions*. London: Academic Press, 19-76.

Gass, S. (1979). "Language transfer and universal grammatical relations." *Language Learning* 29, 327-344.

Gass, S. (1997). *Input, Interaction, and the Second Language Learner*. Mahwah, New Jersey: Lawrence Erlbaum Associates.

Gass, S. M. (2001). "Sentence matching: a re-examination." *Second Language Research* 17, 421-441.

Gass, S. and L. Selinker (eds.) (1992). *Language Transfer in Language Learning*. Amsterdam: John Benjamins.

Gass, S. and L. Selinker (1994). *Second Language Acquisition: An Introductory Course*. Hillsdale, NJ: Lawrence Erlbaum.

Glahn, E., G. Håkansson, B. Hammarberg, A. Holmen, K. Lund and A. Hvenekilda (2001). "Processabililty in Scandinavian second language acquisition." *Studies in Second Language Acquisition* 23, 389-416.

Goad, H., L. White and J. Steele (2003). "Missing inflection in L2 acquisition: defective syntax of L1-constrained prosodic representation?" *Canadian Journal of Linguistics* 48, 243-263.

Goad, H. and L. White (2006). "Ultimate attainment in interlanguage grammars: a prosodic approach." *Second Language Research* 22, 243-268.

Guttman, L. (1944). "A basis for scaling qualitative data." *American Sociological Review* 9, 139-150.

Håkansson, G. (2002). "Learning and teaching of Swedish: a processability perspective." In B. Di Biase (ed.) *Developing a Second Language: Acquisition, Processing and Pedagogy of Arabic, Chinese, English, Italian, Japanese, Swedish.* Language Australia Ltd, 7-16.

Håkansson, G., M. Pienemann and S. Sayehli (2002). "Transfer and typological proximity in the context of second language processing." *Second Language Research* 18, 250-273.

Håkansson, G., C. Norrby and L. Bruzaeus (2005). "Processability Theory applied to spoken and written L2 Swedish." Paper presented at the 5th International Symposium on Processability, SLA and Bilingualism, Deakin University, Melbourne.

Hakuta, K. (1976). "A case study of a Japanese child learning English as a second language." *Language Learning* 26, 321-351.

Hansen, J. G. (2004). "Developmental sequences in the acquisition of English L2 syllable codas: A preliminary study." *Studies in Second Language Acquisition* 26, 85-124.

Harré, R. and G. Gillett (1994). *The Discursive Mind*. Thousand Oaks: Sage.

Hatch, E. (1978). "Discourse analysis and second language acquisition." In E. Hatch (ed.) *Second Language Acquisition: A Book of Readings*. Rowley, MA: Newbury House, 401-435.

Hatch, E. (ed.) (1978). *Second Language Acquisition: A Book of Readings*. Rowley, MA: Newbury House.

Hatch, E. and A. Lazaraton. (1991). *The Research Manual: Design and Statistics for Applied Linguistics*. Boston, MA : Heinle & Heinle.

Hawkins, R. and C. Y-h. Chan (1997). "The partial availability of Universal Grammar in second language acquisition: the 'Failed Functional Features Hypothesis'." *Second Language Research* 13, 187-226.

Hernander-Chavez, E. (1972). "Early code separation in the second language speech of Spanish-speaking children." Paper presented at the Stanford Child Language Research Forum, Stanford: Stanford University.

Huebner, T. (1979). "Order-of-acquisition vs. dynamic paradigm: a comparison of method in interlanguage research." *TESOL Quarterly* 13, 21-28.

Huter, K. (1996). "Atarashii no kuruma and other old friends. The acquisition of Japanese syntax." *Australian Review of Applied Linguistics* 19, 39-60.

Huter, K. (1998). *The Acquisition of Japanese as a Second Language.* Ph. D Dissertation, Australian National University.

Hyltenstam, K. (1977). "Implication pattern in interlanguage syntax variation." *Language Learning* 27, 383-411.

Hyltenstam, K. (1983). "Data types and second language variability." In H. Ringbom (ed.) *Psycholinguistics and Foreign Language Learning.* Abo Akademi: Abo, 42-75.

Itoh, H. and E. Hatch (1978). "Second language acquisition: A case study." In E. Hatch (ed.) *Second Language Acquisition: A Book of Readings.* Rowley, MA: Newbury House, 76-88.

Jansen, L. M. (1987). "The development of word order in formal German second language acquisition." Paper presented at the Workshop on Explaining Interlanguage Development, La Trobe University, Melbourne.

Jansen, L. M. (1991). "The development of word order in natural and formal German second language acquisition." *Australian Working Papers in Language Development* 5, 1-42.

Jansen, L. M. (2000). "Second language acquisition: from theory to data." *Second Language Research* 16, 27-43.

Jansen, L. M. (2002). "Some perspectives on acquisition criteria." In B. Di Biase (ed.) *Developing a Second Language: Acquisition, Processing and Pedagogy of Arabic, Chinese, English, Italian, Japanese, Swedish.* Language Australia Ltd, 45-58.

Jansen, L. M. (2004). "On the fitness of the fit of implicational scales: A discussion paper on the use of implicational scaling in the context of Processability Theory." Paper presented at the PhD Seminar on Processability, SLA and Bilingualism, University of Western Sydney, October 2004.

Jansen, L. M. (2005). "The acquisition of word order in Anglophone formal learners of German: Further empirical evidence." Paper presented at the 5th International Symposium on Processability, SLA and Bilingualism, Deakin University, Melbourne.

Jansen, L. M. (2008) "The acquisition of German word order in tutored learners: A cross-sectional study in a wider theoretical context." *Language Learning* 58, 1, 185-231.

Jia, G. (2003). "The acquisition of the English plural morpheme by native Mandarin Chinese-speaking children." *Journal of Speech, Language, and Hearing Research* 46, 1297-1311.

Jiang, N. (2004). "Morphological insensitivity in second language processing." *Applied Psycholinguistics* 25, 603-634.

Johnson, M. (2004). *A Philosophy of Second Language Acquisition.* London: Yale University Press.

Johnston, M. (1985). "Second language acquisition research in the adult migrant education program." *Prospect Journal* 1, 19-46.

Johnston, M. (1985). "Syntactic and phonological progressions in learner of English." Canberra: Commonwealth Department of Immigration and Ethnic Affairs.

Johnston, M. (1997). *Development and Variation in Learner Language.* Ph.D Dissertation, Australian National University.

Jordens, P. (1977). "Rules, grammatical intuitions and strategies in foreign language learning." *Interlanguage Studies Bulletin* 2, 5-76.

Kaplan, R. and J. Bresnan (1982). "Lexical-Functional Grammar: a formal system for grammatical respresentation." In J. Bresnan (ed.) *The Mental Respresentation of Grammatical Relations.* Cambridge, MA: MIT Press, 173-281.

Kawaguchi, S. (1996). *Referential Choice by Native Speakers and Learners of Japanese.* MA Dissertation, Australian National University.

Kawaguchi, S. (2002). "Grammatical development in learners of Japanese as a second language." In B. Di Biase (ed.) *Developing a Second Language: Acquisition, Processing and Pedagogy of Arabic, Chinese, English, Italian, Japanese, Swedish.* Language Australia Ltd, 17-28.

Keller-Cohen, D. (1979). "Systematicity and variation in the non-native child's acquisition of conversational skills." *Language Learning* 29, 27-44.

Kellerman, E. (1979). "Transfer and non-transfer: where we are now." *Studies in Second Language Acquisition* 2, 37-57.

Kempen, G. and E. Hoenkamp (1987). "An incremental procedural grammar for sentence formulation." *Cognitive Science* 11, 201-258.

Klein, W. (1981). "Some rules of regular ellipsis in German." In W. Klein and W. J. M. Levelt (eds.) *Crossing the Boundaries in Linguistics: Studies Presented to Manfred Bierwisch*. Dordrecht: Reidel, 51-78.

Klima, E. and U. Bellugi (1966). "Syntactic regularities in the speech of children." In J. Lyons and R. Wales (eds.) *Psycholinguistic Papers*. Edinburgh: Edinburgh University Press, 183-208.

Krashen, S. (1977a). "The monitor model for second language performance." In M. Burt, H. Dulay and M. Finocchiaro (eds.) *Viewpoints on English as a Second Language*. New York: Regents, 56-85.

Krashen, S. (1977b). "Some issues relating to the monitor model." In H.D. Brown, C. Yorio and R. Crymes (eds.) *On TESOL '77*. Washington, D.C.: TESOL.

Krashen, S. (1978). "Adult second language acquisition and learning: a review of theory and practice." In R. Gingras (ed.) *Second Language Acquisition and Foreign Language Teaching*. Washington: Centre for Applied Linguistics, 122-157.

Krashen, S. (1980). "The input hypothesis." *Georgetown University Roundtable on Language and Linguistics 1980.* Washington, D. C., 168-180.

Krashen, S. (1981). *Second Language Acquisition and Second Language Learning.* Oxford: Pergamon.

Krashen, S. (1982). *Principles and Practice in Second Language Acquisition.* Oxford: Pergamon.

Krashen, S. (1985). *The Input Hypothesis: Issues and Implication.* Harlow: Longman.

Krashen, S., J. Butler, R. Birnbaum and J. Robertson (1978). "Two studies in language acquisition and language learning." *ITL: Review of Applied Linguistics* 39-40, 73-92.

Lahey, M., J. Liebergott, M. Chesnick, P. Menyuk and J. Adams (1992). "Variability in the use of grammatical morphemes: Implications for understanding language impairment." *Applied Psycholinguistics* 13, 373-398.

Lamb, S. M. (1998). *Pathways of the Brain: The Neurocognitive basis of Language.* Amsterdam/Philadelphia: John Benjamins.

Lantoff, J. P. (1994). "Sociocultural theory and second language learning: Introduction to the special issues." *Modern Language Journal* 78, 418-420.

Lantoff, J. P. (2000). *Sociocultural Theory and Second Language Learning.* Oxford: Oxford University Press.

Lantoff, J. P. and G. Appel (eds.) (1994). *Vygotskyan Approaches to Second Language Research*. Norwood, NJ: Ablex Publishing Corporation.

Larsen-Freeman, D. (1975). "The acquisition of grammatical morphemes by adult ESL students." *TESOL Quarterly* 9, 409-430.

Larsen-Freeman, D. (1976). "An explanation for the morpheme acquisition order of second language learners." *Language Learning* 26, 125-134.

Lee, J. (2000). *Tasks and Communicating in Language Classrooms*. Boston: McGraw-Hill.

Leontiev, A. N. (1981). *Problems of the Development of Mind*. Moscow: Progress Publishers.

Levelt, W. (1983). "Monitoring and self-repair in speech." *Cognition* 14, 41-104.

Levelt, W. J. M. (1989). *Speaking: From Intention to Articulation*. Cambridge, MA: MIT Press.

Levelt, W. J. M, A. Roelofs and A. S. Meyer (1999). "A theory of lexical access in speech production." *Behavioral and Brain Sciences* 22, 1-75.

Long, M. (1980). *Input, Interaction and Second Language Acquisition*. Ph. D Dissertation, University of California at Los Angeles.

Long, M. (1981). "Input, interaction and second language acquisition." In H. Winitz (ed.) *Native Language and Foreign Language Acquisition.* New York: New York Academy of Sciences, Volume 379, 259-278.

Long, M. (1985). "Input and second language acquisition theory." In S. M. Gass and C. G. Madden (eds.) *Input in Second Language Acquisition.* Rowley, MA: Newbury House, 377-393.

Long, M. (1991). "Focus on form: A design feature in language teaching methodology." In K. de Bot, R. Ginsberg and C. Kramsch (eds.) *Foreign Language Research in Cross-Cultural Perspective.* Amsterdam: John Benjamins, 47-57.

Long, M. (1996). "The role of the linguistic environment in second language acquisition." In W. C. Ritchie and T. K. Bhatia (eds.) *Handbook of Second Language Acquisition.* San Diego, CA: Academic Press, 413-468.

Long, M. and C. J. Sato (1984). "Methodological issues in interlanguage studies: and interactionist perspective." In A. Davies, C. Criper and A. P. R. Howatt (eds.) *Interlanguage.* Edinburgh: Edinburgh University Press, 253-288.

Long, M. and P. Robinson (1998). "Focus on form: Theory, research, and practice." In C. Doughty and J. Williams (eds) *Focus on Form in Classroom Second Language Acquisition.* Cambridge: Cambridge University Press, 15-41.

Mackey, A. (1995). *Stepping up the Pace: Input, Interaction and Interlanguage Development: an Empirical Study of Questions in ESL.* Unpublished Ph. D. Dissertation, University of Sydney.

Mackey, A., S. Gass and K. McDonough (2000). "Do learners recognize implicit negative feedback?" *Studies in Second Language Acquisition* 33, 82-92.

Mansouri, F. (2002). "Exploring the interface between syntax and morphology in second language development." In B. Di Biase (ed.) *Developing a Second Language: Acquisition, Processing and Pedagogy of Arabic, Chinese, English, Italian, Japanese, Swedish.* Language Australia Ltd, 59-72.

Mansouri, F. and G. Håkansson (in press). "Intra-stage developmental order: empirical evidence from Arabic and Swedish as second languages." *Australian Review of Applied Linguistics.*

Masterson, D. (1993). *A Comparison of Grammaticality Evaluation Measurements: Testing Native Speakers of English and Korean.* Ph.D Dissertation, University of Hawaii.

McCafferty, S. G. (1992). "The use of private speech by adult second language learners: a cross-cultural study." *Modern Language Journal* 76, 179-189.

McCafferty, S. G. (1994). "Adult second language learners' use of private speech: a review of studies." *Modern Language Journal* 78, 421-426.

McCafferty, S. G., R. F. Roebuck and R. P. Wayland (2001). "Activity theory and the incidental learning of second-language vocabulary." *Language Teaching Research* 10, 289-294.

McLaughlin, B. (1987). *Theories of Second-Language Learning.* Edward Arnold: London.

McCulloch C. E. and S. R. Searle (2001). *Generalised, Linear and Mixed Models*. New York: John Wiley and Sons.

Meisel, J. M. (1980). "Linguistic simplification: A study of immigrant workers' speech and foreigner talk." In S. W. Felix (ed.) *Second Language Development: Trends and Issues*. Tübingen: Gunter Narr, 13-40.

Meisel, J. M., H. Clahsen and M. Pienemann (1981). "On determining developmental stages in natural second language acquisition." *Studies in Second Language Acquisition* 3, 109-135.

Murray, W. S. (1982). *Sentence Matching: The Influence of Meaning and Structure*. Unpublished Doctoral Dissertation, Monash University.

Nassaji, H. and M. Swain (2000). "A Vygotskian perspective on corrective feedback in L2: the effect of random versus negotiated help in the learning of English articles." *Language Awareness* 8, 34-51.

Nemser, W. (1971). "Approximative systems of foreign language learners." *International Review of Applied Linguistics* 9, 115-123.

Nickerson, R. S. (1967). "Same - Different response times with multi-attribute stimulus differences." *Perceptual and Motor Skills* 24, 543-544.

Nicol, J., K. I. Forster and C. Veres (1997). "Subject-verb agreement processes in comprehension." *Journal of Memory and Language* 36, 569-587.

Nicol, J., M. Teller and D. Greth (2001). "Production of verb agreement in monolingual, bilingual and second language speakers." In L. J. Nicol (ed.) *One Mind, Two Languages: Bilingual Language Processing*. Malden, MA: Blackwell, 117-133.

Nguyen, D. L. (1966). *A Constrastive Phonological and Grammatical Study of English and Vietnamese*. Ph. D. Dissertation, Australian National University.

Nguyen, D. L. (1970). *Vietnamese Pronunciation*. Honolulu: University of Hawai'i Press.

Nguyen, L. V., D. H. Nguyen, N. L. T. Than and T. Q. Nguyen (2002). *Tieng Anh 6*. Vietnam: Nha Xuat Ban Giao Duc.

Nunan, D. (1989). *Designing Tasks for the Communicative Classroom*. Cambridge: Cambridge University Press.

Ohta, A. S. (2000). "Rethinking interaction in SLA: developmentally appropriate assistance in the zone of proximal development and the acquisition of L2 grammar." In J. P. Lantolf (ed.) *Sociocultural Theory and Second Language Learning*. Oxford: Oxford University Press, 51-78.

Ohta, A. S. (2001). *Second Language Acquisition Processes in the Classroom: Learning Japanese*. Mahwah, NJ: Lawrence Erlbaum.

Osburne, A. G. (1996). "Final cluster reduction in English L2 speech: A case study of a Vietnamese speaker." *Applied Linguistics* 17, 164-181.

Pallotti, G. (2004). "Methodological issues in testing Processability theory on languages with rich inflectional morphology." Paper presented at the 4th International Symposium on Processability Theory, SLA and Bilingualism, Sassari, Italy.

Piaget, J. and B. Inhelder (1966). *The Psychology of the Child* (trans. H. Weaver). New York, NY: Basic Books.

Pica, T. (1983). "Adult acquisition of English as a second language under different conditions of exposure." *Language Learning* 33, 465-497.

Pica, T. and C. Doughty (1985). "Input and interaction in the communicative language classroom: A comparison of teacher-fronted and group activities." In S. Gass and C. Madden (eds.) *Input in Second Language Acquisition*. Rowley, MA: Newbury House, 115-132.

Pica, T., R. Young and C. Doughty (1987). "The impact of interaction on comprehension." *TESOL Quarterly* 21, 737-758.

Pica, T., L. Holliday, N. Lewis, D. Gerducci and J. Newman (1991). "Language learning through interaction: What role does gender play?" *Studies in Second Language Acquisition* 13, 343-376.

Pienemann, M. (1980). "The second language acquisition of immigrant children." In S. W. Felix (ed.) *Second Language Development: Trends and Issues*. Tübingen: Gunter Narr, 41-56.

Pienemann, M. (1981). *Der Zweitspracherwerb Ausländischer Arbeiterkinder*. Bonn: Bouvier.

Pienemann, M. (1987). "Psychological constraints on the teachability of languages." In C. Platt (ed.) *First and Second Language Acquisition Processes*. Rowley, MA: Newbury House, 143-168.

Pienemann, M. (1998). *Language Processing and Second Language Development: Processability Theory*. Amsterdam: John Benjamins.

Pienemann, M. (2003). "Language processing capacity." In C. Doughty and M. Long (eds.) *The Handbook of Second Language Acquisition*. Blackwell Publishing Ltd, 679-714.

Pienemann, M and M. Johnston (1987). "Factors influencing the development of language proficiency." In D. Nunan (ed.) *Applying Second Language Acquisition Research*. Adelaide: National Curriculum Research Centre, Adult Migrant Education Program, 45-141.

Pienemann, M. and A. Mackey (1993). "An empirical study of childen's ESL development and Rapid Profile." In A. Mackey (ed.) *ESL Development: Language and Literacy in Schools*, Vol 2. Commonwealth of Australia and National Languages and Literacy Institute of Australia, 115-259.

Pienemann, M. and G. Håkansson (1999). "A unified approach toward the development of Swedish as L2: a processability account." *Studies in Second Language Acquisition* 21, 383-420.

Pinker, S. (1994). *The Language Instinct*. London: Penguin Books.

Platt, E. and F. B. Brooks (1994). "The 'acquisition-rich environment' revisited." *Modern Language Journal* 78, 497-511.

Platt, E. and F. B. Brooks (2002). "Task engagement: a turning point in foreign language development." *Language Learning* 52, 365-400.

Porter, J. (1977). "A cross-sectional study of morpheme acquisition in first-language learners." *Language Learning* 27, 47-62.

Prabhu, N. S. (1987). *Second Language Pedagogy*. London: Oxford University Press.

Richards, J. (ed.) (1974). *Error Analysis: Perspectives on Second Language Learning*. London: Longman.

Richards, J. and T. Rogers (1986). *Approaches and Methods in Language Teaching*. Cambridge: Cambridge University Press.

Roebuck, R. F. (2000). "Subjects speak out: how learners position themselves in psycholinguistic task." In J. P. Lantolf (ed.) *Sociocultural Theory and Second Language Learning*. Oxford: Oxford University Press, 81-98.

Rosansky, E. (1976). "Methods and morphemes in second language acquisition research." *Language Learning* 26, 409-425.

Rutherford, W. E. (1982). "Markedness in second language acquisition." *Language Learning* 32, 85-108.

Santry, P. A. (1997). *The Way South Vietnamese Pronounce English.* Frankfurt: Hector.

Sato, C. J. (1984). "Phonological processes in second language acquisition: Another look at interlanguage syllable structure." *Language Learning* 34, 43-57.

Sato, C. J. (1985). "Task variation in interlanguage phonology." In S. M. Gass & C. G. Madden (eds.) *Input in Second Language Acquisition.* Rowley, MA: Newbury House, 181-196.

Savignon, S. J. (1972). *Communicative competence: an experiment in foreign-language teaching.* Philadelphia, Centre for Curriculum Development.

Savignon, S. J. (1983). *Communicative Competence: Theory and Classroom Practice: Texts and Contexts in Second Language Learning.* Reading, MA: Addison-Wesley.

Saunders, N. (1987). "Morphophonemic variations in clusters in Japanese English." *Language Learning* 37, 247-272.

Schachter, J. (1974). "An error in error analysis." *Language Learning* 24, 205-214.

Schachter, J. and W. E. Rutherford (1979). "Discourse function and language transfer." *Working Papers on Bilingualism* 19, 1-12.

Schmidt, M. (1980). "Coordinate structures and language universals in interlanguage." *Language Learning* 30, 397-416.

Schmidt, R. (1983). "Interaction, acculturation, and acquisition of communicative competence." In N. Wolfson and E. Judd (eds.) *Sociolinguistics and Second Language Acquisition*. Rowley, MA: Newbury House, 137-174.

Schumann, J. (1978a). *The Pidginisation Process: a Model for Second Language Acquisition*. Rowley, MA: Newbury House.

Schumann, J. (1978b). "The acculturation model for second language acquisition." In R. Gingras (ed.) *Second Language Acquisition and Foreign Language Teaching*. Arlington, VA: Centre for Applied Linguistics, 27-50.

Schumann, J. (1978c). "Social and psychological factors in second language acquisition." In J. Richards (ed.) *Understanding Second and Foreign Language Learning: Issues and Approaches*. Rowley, MA: Newbury House, 163-178.

Schumann, J. (1982). Simplification, transfer and relexification as aspects of pidginization and early second language acquisition. *Language Learning* 32, 337-366.

Selinker, L. (1972). "Interlanguage." *International Review of Applied Linguistics* 10, 209-231.

Skehan, P. (1996). "A Framework for the Implementation of Task-Based Instruction." *Applied Linguistics* 17, 38-62.

Skehan, P. (1998). "Task-based Instruction." *Annual Review of Applied Linguistics* 18.

Skehan, P. and P. Foster (2001). "Cognition and Tasks." In P. Robinson (ed.) *Cognition and Second Language Instruction.* Cambridge: Cambridge University Press, 183-205.

Skinner, B. F. (1957). *Verbal Behaviour.* New York: Appleton-Century-Crofts.

Slabakova, R. (1997). "Some aspect-related constructions in English – a sentence matching investigation." In A. Sorace, C. Heycock and R. Shillcock (eds.) *Proceedings of the GALA '97 Conference on Language Acquisition.* Amsterdam: North-Holland, 450-455.

Swain, M. (1985). "Communicative competence: Some roles of comprehensive input and comprehensive output in its development." In S. Gass and C. Madden (eds.) *Input in Second Language Acquisition.* Rowley, MA: Newbury House, 235-253.

Swain, M. (1995). "Three functions of output in second language learning." In G. Cook and B. Seidlhofer (eds.) *Principle and Practice in Applied Linguistics: Studies in Honour of H. G. Widdowson.* Oxford: Oxford University Press, 125-144.

Swain, M. (2005). "Languaging, agency and collaboration." Plenary paper presented at the 30th Annual Congress of the Applied Linguistics Association of Australia, Melbourne University, Australia.

Swain, M., N. Naiman and G. Dumas (1978). "Aspects of the learning of French by English-speaking five-year-olds." In E. Hatch (ed.) *Second Language Acquisition: A Book of Readings.* Rowley, MA: Newbury House, 297-309.

Swain, M. and S. Lapkin (1998). "Interaction and second language learning: two adolescent French immersion students working together." *Modern Language Journal* 82, 320-337.

Swain, M., L. Brooks and A. Tocalli-Beller (2002). "Peer-peer dialogue as a means of second language learning." *Annual Review of Applied Linguistics* 22, 171-185.

Tarone, E. (1979). "Interlanguage as chameleon." *Language Learning* 29, 181-191

Tarone, E. (1983). "On the variability of interlanguage systems." *Applied Linguistics* 4, 142-163.

Tran, C. C. (1975). "Error analysis, contrastive analysis and students' perception: a study of difficulty in second language learning." *International Review of Applied Linguistics* 13, 119-143.

Ur, P. (1996). *A Course in Language Teaching: Practice and Theory*. Cambridge [England]; New York: Cambridge University Press.

Vainikka, A. and M. Young-Scholten (1994). "Direct access to X'-theory: evidence from Korean and Turkish adults learning German." In T. Hoekstra and B. Schwartz (eds.) *Language Acquisition Studies in Generative Grammmar*. Amsterdam: Benjamins, 265-316.

Vigliocco, G., B. Butterworth and M. F. Garrett (1996). "Subject-verb agreement in Spanish and English: Differences in the role of conceptual constraints." *Cognition* 61, 261-298.

Vigliocco, G., B. Butterworth and C. Semenza (1995). "Constructing subject-verb agreement in speech: The role of semantic and morphological factors." *Journal of Memory and Language* 34, 186-215.

Vigliocco, G., R. J. Hartsuiker, G. Jarema and H. H. J. Kolk (1996). "How many labels on the bottles? Notional concord in Dutch and French." *Language and Cognitive Processes* II, 407-442.

Vygotsky, L. S. (1978). *Mind in Society: The Development of Higher Psychological Processes*. Cambridge, MA: Harvard University Press.

Vygotsky, L. S. (1987). *The Collected Works of L. S. Vygotsky: Volume 1. Thinking and Speaking*. New York, NY: Plenum Press.

Wendel, J. (1997). *Planning and Second Language Production*. Ed. D. Dissertation, Temple University Japan.

Wode, H. (1981). *Learning a Second Language: An Integrated View of Language acquisition*. Tübingen: Gunter Narr.

Wright, T. (1987). "Instructional task and discoursal outcome in the L2 classroom." In C. Candlin and D. Murphy, *Language Learning Tasks*. New Jersey: Prentice Hall International, 63-97.

Young, R. (1986). "The acquisition of a verbal repertoire in a second language." *Penn Working Papers in Educational Linguistics* 2(1), 85-119.

Young, R. (1991). *Variation in Interlanguage Morphology.* New York: Peter Lang Publishing.

Yule, G. and D. McDonald (1990). "Resolving referential conflicts in L2 interaction: The effect of proficiency and interactive role." *Language Learning* 40, 539-556.

Zhang, Y. (2001). *Second Language Acquisition of Chinese Grammatical Morphemes: a Processability Perspective.* Ph. D Dissertation, Australian National University.

Zhang, Y. (2002). "A processability approach to the L2 acquisition of Chinese grammatical morphemes." In B. Di Biase (ed.) *Developing a Second Language. Acquisition, Processing and Pedagogy of Arabic, Chinese, English, Italian, Japanese, Swedish.* Language Australia Ltd, 29-44.

Zobl, H. (1982). "A direction for contrastive analysis: the comparative study of developmental sequences." *TESOL Quarterly* 16, 169-183.